# NORTHEASTERN UNIVERSITY

COLLEGES OF

# Liberal Arts
# Business Administration
# Engineering

1947-1948

(CO-EDUCATIONAL)

BOSTON 15, MASSACHUSETTS

*January, 1947*

3M-5-45

# ADVISER'S CARD

NAME | DIVISION | COURSE | YEAR

| ENROLLED SUBJECTS | GRADES 9/8 | 1st PERIOD | 11/5 11/17 | 2nd PERIOD | 1/24 1/26 | 3rd PERIOD | 4/3 4/5 3/8 4/4 4/18 | 4th PERIOD | 7/17 | 7/19 7/31 | FINAL GRADE | 8/2 9/4 9/6 9/11 | COND. EXAM. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62A A11 Col | | A1 | | A2 | | A3 | | A4 | | | | | | |
| 52B A11 | | | | B1 | | B2 | | B3 | B4 | | | | B4 | |
| 51A A11 | | A5 | | Coop | | A6 | | Coop | Coop | → | V | | A7 | |
| 51B A11 | | Coop | | B5 | | Coop | | B6 | B7 | V | Coop → | | | |
| 51FT BH | | SF4-F7 | | out | | F5 | | F6 | | | | | | |
| 51FT2A | | F5 | | out | | F6 SF8-F10 | | SF7-F10 | | | | | | |
| | | | | | | | | | | | | | | |
| 50C-A A11 | | A8 | | Coop | | A9 | | Coop | Coop | → | V | | A10 | |
| 50C-B A11 | | Coop | | B8 | | Coop | | B9 | B10 | V | Coop → | | | |
| 50CFT A11 | | F8 | | F9 | | F11 | | F12? | | | | | | |
| 50CFT Non Chem | | F8 | | SF10-F10 | | F9 | | | | | | | | |
| | | | | | | | | | | | | | | |
| 50A | | S1 | | S2 | | Commencement | | | | | | 4/31/48 2PM | | |
| 50B | | | | | | | | 11 | | | | 6/20/48 | Sunday | |
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| | | | | | | | | | | | | | | |
| ADVISER | | | | | | | | | | | | | | |


RICHARDS HALL

# NORTHEASTERN UNIVERSITY

# DAY COLLEGES

## *General Information*

1947-1948

208 = LA
217 = BA
234 = Eng


(CO-EDUCATIONAL)

BOSTON 15, MASSACHUSETTS
JANUARY, 1947

# NORTHEASTERN UNIVERSITY

## *Day Colleges*

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COLLEGE OF LIBERAL ARTS

COLLEGE OF BUSINESS ADMINISTRATION

COLLEGE OF ENGINEERING

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CONDUCTED ON THE CO-OPERATIVE PLAN

## *Table of Contents*

# Freshman Academic Calendar

## September, 1947 to September, 1948

### 1947

| | | |
|---|---|---|
| September | 4 | *Thursday:* Registration and opening of college year for the Division A Freshman Class (1952). Students failing to register promptly on this date will be charged a late registration fee of five dollars ($5.00). |
| October | 13 | *Monday:* Observance of Columbus Day. (College exercises omitted.) |
| November | 11 | *Tuesday:* Armistice Day. (College exercises omitted.) |
| November | 13 | *Thursday:* Registration and opening of college year for Division B Freshman Class (1952). Students failing to register promptly on this date will be charged a late registration fee of five dollars ($5.00). |
| November | 15 | *Saturday:* End of first term for the Division A Freshmen (1952). |
| November | 17 | *Monday:* Second term begins for Division A Freshmen (1952). |
| November | 28 | *Thursday:* Thanksgiving. (College exercises omitted.) |
| December | 24 | *Wednesday:* College exercises omitted after 1:00 p.m. |
| December | 25 | *Thursday:* Christmas. (College exercises omitted.) |

### 1948

| | | |
|---|---|---|
| January | 1 | *Thursday:* New Year's Day. (College exercises omitted.) |
| January | 24 | *Saturday:* End of second term for Division A Freshmen (1952) and end of first term for Division B Freshmen (1952). |
| January | 26 | *Monday:* Third term begins for Division A Freshmen (1952) and second term begins for Division B Freshmen (1952). |
| February | 23 | *Monday:* Observance of Washington's Birthday. (College exercises omitted.) |
| April | 3 | *Saturday:* End of third term and college year for the Division A Freshmen (1952) and of the second term for the Division B Freshmen (1952). |
| April | 5 | *Monday:* Beginning of five-week summer term for the Division A Freshmen (1952). Summer term may be taken at this time or beginning August 9. |
| April | 19 | *Monday:* Patriots' Day. (College exercises omitted.) |
| May | 8 | *Saturday:* First five-week summer term for the Division A Freshmen (1952) closes. |
| May | 10 | *Monday:* Beginning of summer term vacation period for the Division A Freshmen (1952). |
| May | 31 | *Monday:* Observance of Memorial Day. (College exercises omitted.) |
| June | 12 | *Saturday:* End of third term and college year for the Division B Freshmen (1952). |
| June | 14 | *Monday:* Beginning of eight-week summer vacation period for the Division B Freshmen (1952). |
| August | 9 | *Monday:* Beginning of five-week summer term period for the Division B Freshmen (1952) and for those students in the Division A Freshmen Class (1952) who did not attend in the first summer term period. |
| September | 13 | *Monday:* Registration and opening of college year for the Division A and Division B Sophomore Class (1952). |

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# Northeastern University

## *General Statement*

NORTHEASTERN UNIVERSITY is incorporated as a philanthropic institution under the General Laws of Massachusetts. The State Legislature, by special enactment, has given the University general degree granting powers.

The Corporation of Northeastern University consists of men who occupy responsible positions in business and the professions. This Corporation elects from its membership a Board of Trustees in whom the control of the institution is vested. The Board of Trustees has four standing committees: (*a*) an Executive Committee which serves as an Ad Interim Committee between the regular meetings of the Board of Trustees and has general supervision of the financial and educational policies of the University; (*b*) a Committee on Buildings which has general supervision over the building needs of the University; (*c*) a Committee on Funds and Investments which has the responsibility of administering the funds of the University; (*d*) a Committee on Development which is concerned with furthering the development plans of the University.

Founded in 1898, Northeastern University, from the outset, has as its dominant purpose the discovery of human and social needs and the meeting of these needs in distinctive and highly serviceable ways. While subscribing to the most progressive educational thought and practice, the University has not duplicated the programs of other institutions but has sought "to bring education more directly into the service of human needs."

With respect to program, Northeastern has limited itself:

—To offering, in its several schools, basic curricula from which non-essentials have been eliminated;
—To effective teaching;
—To advising and guiding students;
—To giving students the chance to build well-rounded personalities through a balanced program of extracurricular activities.

The Northeastern Plan of Education is especially designed for the student who must earn while he learns. In the main, it consists of two definite types of education:

— Co-operative Education by Day,
— Adult Education by Night.

The plan has been developed in such a way that experience in jobs with pay is utilized to help students of limited financial resources secure an education and at the same time gain the maximum educational benefit from their practical experience. So far as the New England States are concerned, Northeastern University is the only institution whose day colleges, other than the School of Law, are conducted under the Co-operative Plan.

The several schools and programs of the University are conducted either under the name "Northeastern University" or by its affiliated schools — the Lincoln Schools and The Huntington Day School for Boys. The following is a brief outline of the principal types of educational opportunities offered.

In the field of Co-operative Education there are three day colleges — the College of Liberal Arts, the College of Engineering, and the College of Business Administration. The College of Liberal Arts offers majors in the usual fields of the arts and the sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. The College of Engineering, one of the largest engineering colleges in the United States, has curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. The College of Business Administration has curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. The College of Engineering and the College of Business Administration confer the degree of Bachelor of Science with specification indicating the field of specialization. The Co-operative Plan, under which all of these day colleges operate, enables the student to alternate regular periods of classroom instruction with supervised employment in an industrial or commercial position, thus combining theory and practice in an exceedingly effective manner. Apart from the educational advantages of the Co-operative Plan is the opportunity for self-support while the student is pursuing his studies at Northeastern University. During the co-operative periods, students not only gain experience but are also paid for their services. Approximately three hundred business and industrial concerns co-operate with Northeastern University in making this program effective.

The School of Law conducts both a day and an evening undergraduate program which prepares for admission to the bar and for the practice of the law and leads to the degree of Bachelor of Laws.

The Adult Education Program has been developed in the evening work of the School of Law as indicated above, in the School of Business, and in the evening courses of the College of Liberal Arts. The School of Business has curricula in Management, Accounting, Distribution, Law and Business, and Engineering and Management. It also conducts a Labor Relations Institute. This School awards the Bachelor of Business Administration degree with specification. The University also operates a division of the School of Business in Springfield. The College of Liberal Arts offers certain of its courses during evening hours constituting a program, three years in length, equivalent in hours to one-half the requirements for the A.B. or S.B. degree, and providing a general education and preparation for admission to the School of Law. The degree of Associate in Arts is conferred upon those who complete this program.

The Adult Education Program has also been developed through the Lincoln Schools, which are affiliated with and conducted by Northeastern University. The classes in these schools are held at convenient evening hours. The Lincoln Technical Institute offers curricula upon a college level in various phases of engineering leading to the degree of Associate in Engineering; whereas the Lincoln Preparatory School,

accredited by the New England College Admissions Board, prepares students for admission to college and offers other standard high school programs.

The Huntington Day School for Boys, also affiliated with and conducted by Northeastern University, is the outgrowth of a demand in the city of Boston for an urban preparatory school with high educational standards which would furnish thorough preparation for admission to the leading colleges and universities. While easily accessible to the various sections of Boston and to the suburbs, it has the facilities of a country day school and offers a country day school program. This School is one of the leading preparatory schools of the country.

# Buildings and Facilities

## Boston—A Great Educational Center

The fact that Northeastern University is in Boston broadens the educational and cultural opportunities of its students. Few other cities in the country are so rich in the finest elements of American life. Many of its historic buildings, such as the Old State House, Faneuil Hall, and the Old North Church, have become museums for the preservation of old documents, paintings, and other collections representative of early colonial life. The Boston Public Library and the Museum of Fine Arts, both within a few blocks of the University Buildings, are widely noted for their treasures of literature and art. Even nearer to the University is Symphony Hall, home of the world-famous Boston Symphony Orchestra. And the many churches within Greater Boston not only afford the opportunity of hearing distinguished preachers but through their student clubs and young people's societies make possible for students a fine type of social and intellectual life.

## University Buildings

### Location

Northeastern University, except for the Law School, is housed in five buildings located on Huntington Avenue, Boston, at the entrance to the Huntington Avenue Subway and opposite the historic Boston Opera House. The main administrative offices of the University are located in Richards Hall, a four-story brick structure added to the physical plant of Northeastern in 1938.

The chief railroad centers of Boston are the North and South Stations. To reach the University from the North Station, board a car going to Park Street, at which junction transfer to any Huntington Avenue car. To reach the University from the South Station, board a Cambridge subway train for Park Street Under. There go up one flight of stairs and board any Huntington Avenue car.

### Beacon Hill Building

The building housing the Law School at 47 Mt. Vernon Street is a three-story structure completely equipped with administrative offices, faculty offices, classrooms, library and student recreational rooms.

### East Building

The East Building houses the University Library, the Business Administration Laboratory, and several department offices. Jacob P. Bates Hall is also in this building. The latter is used for University band and orchestra rehearsals, glee club rehearsals, and entertainments, as well as dramatic club work.

## *New Building*

The New Building is the second unit of the new Northeastern plant. It has a basement and four stories housing laboratories, classrooms and a recreation area, the *University Commons.* Chemical engineering laboratories and classrooms take up the entire basement. The second floor contains a large lecture hall and classrooms. The Advertising Laboratory and classrooms take up the entire third floor. The fourth floor is given over almost entirely to the biological laboratories and biology lecture room.

## *Richards Hall*

Richards Hall was the first unit of the new Northeastern plant. Its 100,000 square feet of floor area provide ample space for administrative offices, the Bookstore, reading rooms, lounges, Chapel, special veterans' service areas, and many other facilities.

The major portion of the building is given over to laboratories and classroom areas. Laboratory space is provided for the following: Mechanical Engineering, Industrial Engineering, General and Advanced Physics, Inorganic, Organic, Analytical, and Physical Chemistry, together with several special research laboratories.

Outstanding among the classroom areas are a large chemistry lecture hall and two general lecture halls seating 300 and 200 students respectively. On the fourth floor are located three large, light and well-equipped drawing rooms, together with an art room for carrying on designing and drafting which form so important a part of technical work. The penthouse contains a radio laboratory, astronomy laboratory, and a blueprint room.

## *Student Center Building*

(Under construction — ready for occupancy September, 1947)

The Student Center Building now being constructed will contain 83,000 square feet of floor space.

The ground floor will contain the University Bookstore, a large University Commons where luncheons may be purchased at low cost by the students, a women's recreational area, a faculty lounge, and a student game room. The main entrance to the building will be on the first floor, where there will also be the main lobby, Student Activities administration offices, a medical suite, a public lounge, a women's lounge, and an auditorium seating 1,350. On the second floor will be a well-appointed Chapel, a student reading and study room, a large student lounge, and the offices of the Dean of Chapel. On the third floor will be located another reading room, a study hall, offices and work rooms for student activities, and certain classrooms. The fourth floor will be devoted primarily to classrooms.

## *South Building*

The South Building, located directly behind the East Building, houses the following laboratories: Advanced Industrial Electronics, Electrical Measurements, Dynamo, High Tension, Electronics and Communica-

tions, Ultra High Frequency, Hydraulics and Sanitary Engineering, and Concrete and Highway. In addition, it provides space for department offices, classrooms, conference rooms and one large drafting room.

## *Laboratories*

The laboratories of the University fall into three categories. The first group includes those for experimental work in the pure sciences of biology, chemistry, and physics. The second includes those for the study of engineering in its major branches (civil, mechanical, electrical, chemical, and industrial). The third comprises the business and statistical laboratory.

In addition to these laboratory facilities which are described in the following pages, motion pictures and lantern slides are frequently used to supplement classroom instruction. For this purpose, there are available motion picture projectors for both sound and silent film as well as several lantern slide projectors.

### *Biology*

The Department of Biology occupies the fourth floor of the New Building, which contains, in addition to the Zoological, Anatomical and Botanical Laboratories, its offices, research areas, and lecture hall. The laboratories are fully equipped for general and special work, with extensive collections of museum preparations, models, and specimen collections displaying thousands of specimens illustrating the various fields of biological study.

### *Chemistry*

The Chemical Laboratories located on the fourth floor of Richards Hall were given to the University by the Charles Hayden Foundation. They are splendidly equipped for work in general and inorganic chemistry, qualitative and quantitative analysis, and organic and physical chemistry. In addition, several service rooms and space for a limited amount of research are provided.

*General Chemistry and Qualitative Analysis*—This laboratory is fully equipped with water, gas, electricity, steam, and fume hoods. A hydrogen-sulphide room, a balance room, and a conference room are also a part of this unit.

*Organic Chemistry*—This laboratory provides about six feet of working space for each student. The facilities are similar to those in the general chemistry laboratory and, in addition, there is provided a large evaporating unit and an organic combustion furnace.

*Quantitative Analysis and Physical Chemistry*—The tables and fume hoods and other equipment in this room are similar to those in the Organic Laboratory. In addition, a large drying oven, special balances, electrical instruments, temperature measuring devices, and other specialized apparatus are provided.

A small laboratory for technical analysis of such materials as coal, vegetable oils, petroleum, textiles, and rubber adjoins the main laboratory, and a special laboratory is also available for electrolytic work.

*Research*—Three small laboratories are equipped for advanced research. These are available for graduate thesis investigations.

## *Physics*

The Physics Laboratories located on the second floor of Richards Hall are fully equipped for elementary and advanced study as well as research. In addition, an astronomy laboratory and an amateur radio transmitting station are located in the penthouse on Richards Hall.

*General*—This laboratory, designed for elementary instruction, is provided with gas, water, and electricity. A spectrometer room, a photographic room, and a photometer room are directly connected with this laboratory.

A second smaller laboratory is equipped for more specialized experiments, and has facilities for glass blowing and high vacuum work. A flexible electrical system here permits use of all the supplies available to the Advanced Laboratory.

*Advanced*—This laboratory is designed with a view to both precision and flexibility. A special switchboard provides single phase and polyphase alternating current and a variety of direct current potentials. A workshop with lathe, drill press, grinder, and other tools as well as two separate research rooms complement the laboratory.

*Optics*—This laboratory used for advanced work in both physical and geometrical optics is especially equipped for the former. Direct electrical connection to the special switchboard in the Advanced Laboratory is provided for use with the various light sources.

*Radio*—This laboratory has a complete set of apparatus for conducting experiments in Radio and Electronic Circuits. Apparatus includes crystal oscillators, audio and radio frequency amplifiers, audio and radio frequency oscillators, cathode ray oscilloscopes, frequency modulation and industrial electronic equipment, complete radio transmitters and receivers.

The amateur radio transmitting station is in a completely shielded room and operates on both radiotelephone and radiotelegraph. Facilities are also available for research.

*Astronomy*—The astronomy laboratory is provided with equipment for grinding mirrors and constructing telescopes, and a platform on the roof provides a very good unobstructed view for making observations.

## *Civil Engineering*

Most of the laboratory work in civil engineering is, of course, actual field work in surveying. A considerable amount of demonstration equip-

ment including many models is available for use in the study of structures, hydraulics, sanitary engineering, highways, concrete and soil mechanics.

*Surveying*—The Department of Civil Engineering is provided with a variety of excellent and up-to-date equipment for field work. The instruments have been chosen to make possible the working out of advanced as well as elementary field problems, and to acquaint the students with the principal makes and types of instruments in general use.

*Hydraulics and Sanitary Engineering*—This laboratory located on the first floor of the South Building is equipped with demonstration measuring devices for use in connection with the courses in hydraulics.

Complete equipment is also provided for water and sewage analysis, and research students can be accommodated in this field.

*Concrete and Highway Engineering*—Located on the second floor of the South Building, this laboratory is equipped for conducting all the routine tests on cement and aggregate. The 300,000 lb. Riehle testing machine in the Mechanical Engineering Department is available for compression tests on concrete cylinders.

Equipment is also available for conducting a major portion of the accepted tests on bituminous materials as used in highway work. Soil Mechanics equipment consists of a general soil sampler, consolidometer, wet-mechanical gram-size analysis and a quicksand demonstration tank.

*Aerial Photogrammetry*—The apparatus in this laboratory may be used to instruct the students in the basic principles of photogrammetry, or may be used to instruct the students in the more technical phases of photogrammetry such as horizontal control, vertical control, stereoscopic plotting, mechanical triangulation, and the tri-metrogon method of plotting.

## *Mechanical Engineering*

The Mechanical Engineering Department has a well-equipped laboratory containing a wide variety of modern machines and occupying over 10,000 square feet of floor space in Richards Hall. A canal located in the laboratory, having a capacity of about 18,000 gallons of water, is used for hydraulic experiments. Special areas are available for oil testing, mechanics, research and similar purposes. Auxiliary equipment is used for making the usual tests and measurements.

*Steam Power*—The apparatus operated by steam includes a wide variety of steam engines, turbines, pumps, condensers, heat exchangers, and measuring instruments.

*Hydraulic Equipment*—Water pumps are available for testing and include piston pumps, centrifugal pumps, power and rotary pumps, as well as a pulsometer and steam injector. Different types of weirs with hook gages, and other flow measuring devices including pilot tube, venturi tube, orifice and water meters are used for flow of fluids experiments.

*Fans and Air Compressors*—A steam driven air compressor and a centrifugal fan are arranged for testing purposes.

*Heating, Refrigeration, and Air Conditioning*—Heating equipment includes a steam boiler, a hot air furnace and a unit steam heater. Air conditioning apparatus is available for heating, cooling, humidifying and dehumidifying. There is in addition a constant temperature room which may be used for either heating or cooling purposes.

*Metallography and Heat Treatment*—A metallograph capable of magnifying up to 2500 diameters is available for photographing crystalline structures of metals and alloys. Sanding and polishing equipment, and metallurgical microscopes are used in the preparation and examination of the specimens.

For the study of heat treatment, several electric furnaces and a gas-fired furnace are available for use.

*Internal Combustion Equipment*—Included under this heading are several gasoline and oil engines, automobile engines and Diesel engines. Some of these are set up for running experimental tests, but several are available for dismantling and demonstration purposes.

*Testing Materials*—Universal testing machines of 10,000, 50,000 and 300,000 lb. capacities are used for most of the tests. In addition, there are three types of hardness testers, 10,000 in. lb. torsion, 220 ft. lb. impact, endurance and bend units as well as equipment for non-destruction tests, such as photoelasticity. Suitable strain gages and other instruments for conducting the undergraduate tests are available.

*Aeronautics*—The laboratory is provided with a 3-foot hexagonal throat wind tunnel for model testing up to speeds of 150 miles per hour. A number of types of airplane engines are available for inspection and dismantling purposes. Demonstration apparatus for streamline flow is also included.

*Metal Processing*—The laboratory for metal processing consists of lathes, planers, boring mill, drill presses, milling machine, and small tools. The laboratory also has numerous heat treatment furnaces, oxyacetylene welding and cutting tools, electric resistance welding and other equipment to adequately carry on the work in production processes.

*Miscellaneous Equipment*—In addition to the apparatus previously mentioned, the laboratory has available testers for calibrating gages, oil testing equipment, fuel calorimeters, steam calorimeters, and friction testers, as well as instruments for measuring speed, temperatures, pressures and flow of fluids.

## *Electrical Engineering*

The ground floor and part of the first floor of the South Building is occupied by the electrical laboratories. These cover an area of approxi-

mately 9000 square feet and include the dynamo, measurements, high tension, electronics and communications, ultra high frequency, and advanced industrial electronics laboratories.

*Dynamo*—This laboratory is provided with both 60 cycle 3 phase 230 volt alternating current and 115-230 volt three-wire direct current power services. The equipment includes more than sixty motors and generators, both AC and DC, of different types, together with the necessary auxiliary equipment to operate and test them. In addition, there are numerous transformers and other static equipment including a steel tank mercury arc rectifier unit. The motors and generators have been selected to reduce as much as possible the risk from high voltage and yet be typical of the range of commercial apparatus.

*Electrical Measurements*—The equipment here is of two distinct types: first, that planned primarily for teaching principles of measurement and, secondly, that which is used in teaching advanced standardizing methods as well as for calibrating instruments in other laboratories of the University. Briefly, this laboratory is equipped for practically any work in electrical measurements except for the absolute determinations carried on in national standardizing laboratories.

*High Tension*—This laboratory is equipped with the necessary transformers and auxiliary equipment to provide 4 Kva. at 50,000 volts potential. A special room has been equipped for cable and insulation testing, and impulse testing of insulation is made possible by a surge generator capable of producing waves having crest values up to 300,000 volts. A 4,000 ampere low voltage transformer is also available for the study of the effects of heavy currents in conductors, switches, and contacts.

*Electronics and Communications*—This laboratory is equipped with apparatus for about forty experiments in the field of electronics and radio-engineering. The apparatus includes several radio frequency signal generators, vacuum tube voltmeters, cathode-ray oscilloscopes, audio oscillators and a primary frequency standard.

*Ultra High Frequency*—The equipment in this laboratory consists of several ultra-high-frequency generators, cylindrical and rectangular wave guides, antenna arrays and reflectors, frequency measuring equipment, and power measuring devices.

*Advanced Industrial Electronics*—In this laboratory equipment is available to demonstrate and test power apparatus controlled by electronic means. The following pieces of equipment are among those found in this laboratory: Induction and Dielectric heating, Industrial X-Ray, Controlled Welding, Ignitron Inverter and Rectifier, Motor speed control, Generator voltage control, Electrostatic air cleaning, Photoelectric control, and Automatic Synchronizing apparatus. Characteristics of individual power electron tubes are also investigated, including high vacuum rectifiers, ignitrons and thyratrons.

## *Chemical Engineering*

The Department is now located on the ground floor of the New Building. A total of 8,218 square feet has been allotted for its exclusive use.

*Unit Operations Laboratory*—This laboratory is primarily devoted to the study of flow of fluids, filtration, heat transfer, distillation, evaporation, absorption, and drying; but houses in addition equipment for carrying out such unit processes as nitration, reduction, and sulphonation.

Approximately 1,000 square feet of this laboratory consists of a double floor area serviced by a traveling crane for installing and repairing semi-plant scale equipment.

*Crushing, Grinding and Separation Laboratory*—A separate laboratory equipped with a ventilating fan houses equipment for crushing, pulverizing, and separating solids. All equipment is operated by individual electric motors with speed control frequently taken advantage of to get experimental data.

*Machine Shop*—A small, well-equipped shop is available for the construction and repair of equipment.

*Research Space*—In addition to the Research Laboratory, the mezzanine floor of the Unit Operations Laboratory is available for investigating new processes.

*Industrial Chemical Laboratory*—This laboratory is equipped with modern laboratory benches and is located next to the stock room. The determination of the optimum conditions for carrying out unit processes on a small scale is accomplished in this laboratory.

## *Industrial Engineering*

Students in the Department of Industrial Engineering share in the use of the Mechanical Engineering Laboratories and the Business Laboratory.

*Industrial Engineering Laboratory*—This laboratory which is located in Richards Hall is completely equipped with the latest facilities and tools used by methods engineers. Besides the general equipment consisting of benches, tables, lathe, jigs, fixtures, and racks, the laboratory has an ample supply of time study boards, stop watches and timers for time study work. There is also available complete motion picture equipment and microchronometers for micromotion work.

## *Business and Statistical Laboratory*

The Business and Statistical Laboratory is equipped with the commonly used office machines, as well as a number of business charts and maps. It is available for laboratory work in accounting and statistics and

is in charge of a graduate assistant whose duty it is to maintain the machines in excellent order, and to give instruction in their uses. Principal pieces of equipment include typewriters, hand and electric calculators, and hand and electric adding machines.

## Design and Drafting Rooms

The University possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, files containing blueprints, and photographs of machines and structures that represent the best practice. Drafting room blackboards are equipped with traveling straightedge devices which facilitate speed and accuracy in blackboard demonstrations.

## Libraries

The general University library is located on the first floor of the East Building. The reading room seats about 360 students at one time, and the stack capacity approximates 25,000 volumes. Here are available all of the general reference books, most of the professional and scientific volumes, and most of the periodicals to which the University subscribes.

Library hours are as follows:

8:45 A.M. to 7:30 P.M. Mondays through Fridays
8:45 A.M. to 1:00 P.M. Saturdays
Closed on Sundays and Holidays

The library is under the direction of a librarian and several competent assistants all of whom have had special training for the work.

A general reading room and library is maintained by the Northeastern Student Union in Room 356, Richards Hall. The books located here are chiefly nontechnical works dealing with contemporary affairs, religious problems, international relations, travel, etc., among which students may browse during periods of relaxation. A few of the literary and religious periodicals are also available in this room.

### Boston Public Library

All members of the University, whether resident or nonresident students, have the privilege of taking books from the Boston Public Library and of using the library for general reference and study. Inasmuch as this is one of the best in the country, it presents unusual opportunities to the students. Within a few minutes' walk from the University, it enables students to have unlimited reference at any time to books and periodicals bearing upon their studies.

## Lecture Assembly Halls

Through special arrangement, Jordan Hall, Symphony Hall, and the Boston Opera House are made available for assembly purposes. These halls provide ample space for student activity assemblies and for special lectures by noted men, which are given sometimes under the direction of the student body and other times under the direction of the faculty. The special lectures are devoted to those elements of life which count most in the development of a man's viewpoint and his character.

## Equipment for Physical Training

Northeastern has exceptional facilities for all-round physical training. The gymnasium is one of the most complete in New England. Adjoining Richards Hall is a large field equipped for athletics. Here are two tennis courts, an outdoor gymnasium with a softball diamond, and other athletic facilities.

### *Natatorium and Gymnasium*

The Natatorium is located in the East Building between the assembly hall and gymnasium. It is 75 feet long and 25 feet wide and is generally regarded as one of the finest of its kind in this area.

The Gymnasium is known as the Samuel Johnson Memorial Gymnasium and provides the following facilities: three gymnasiums, a twelve-lap running track, boxing and wrestling rooms, handball and squash courts, bowling alleys, showers, steam baths, massage rooms, electric cabinet baths, and locker rooms.

### *Huntington Field*

Huntington Field, the University athletic field, is located on Kent Street in Brookline and provides ample facilities for track, baseball, football and other outdoor sports. The University maintains bus service between its Huntington Avenue plant and the Huntington Field, making it possible for students to get back and forth with a minimum loss of time. The field is equipped with a commodious field house as well as ten sections of stadium seats for spectators.

# Student Activities

Northeastern University regards student activities as an integral part of its educational program. One of the main departments of the University, it is charged with the responsibility of co-ordinating the various types of activities and of administering the social, musical, literary, and athletic organizations in such a way as to enable each to contribute in a wholesome, worthwhile manner to student life at Northeastern. Every student is encouraged to participate in such activities as may appeal to him, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of all students.

Members of the faculty also are interested in the informal aspects of the college program. Teaching loads are kept sufficiently low so that the instructional staff may have ample opportunity to mingle with students outside of the classroom in social activities and on the athletic field. In fact, some member of the faculty is appointed to serve as adviser for each student activity. His function is not to dictate how the organization shall be run, but to encourage the students in their extracurricular endeavors and to give them the benefit of his mature point of view in solving the problems that inevitably arise.

One of the outstanding contributions of the Co-operative Plan in the field of higher education has been its capacity to develop in students those powers of social understanding that are so essential to success in professional life. At Northeastern the program of student activities is made to contribute to this end in a very real way. It is a conscious aim of the student activities advisers to develop among their advisees those qualities of personality and character which will enhance their usefulness as future professional men and citizens. Students have splendid opportunities to develop administrative and executive ability as leaders of undergraduate organizations. No academic credit is awarded for any student activity. This has been no deterrent, however, to student participation in extracurricular activities, for a recent survey of the undergraduate body showed that over ninety per cent of the enrollment were engaged in one or more forms of student activity.

## *Athletic Association*

All students in the Day Colleges are members of the Northeastern University Athletic Association. Policies of the association are passed upon by a Faculty Committee on Student Activities. This committee decides what students are eligible to participate in athletics, what the various sports schedules shall be, and what students may be excused from classes to represent the University on athletic trips.

The actual administration of the athletic program is in the hands of a second committee, known as the General Athletic Committee, which consists of the Director of Student Activities, the captains and managers of all varsity teams, and the coaches as ex officio members.

The University maintains both varsity and freshman teams in baseball, basketball, cross-country, football, hockey, and track. Intercol-

legiate games and meets are arranged with the leading colleges in the East. In addition to intercollegiate athletics the athletic association conducts an intramural program in various sports.

## *Honor Societies*

Three honorary societies are chartered by the University in its Day Colleges:

Tau Beta Pi, in the College of Engineering (*for men only*).
The Sigma Society, in the College of Business Administration.
The Academy, in the College of Liberal Arts.

Election to the college honorary societies is founded primarily upon scholarship, but before a man or woman is privileged to wear the honorary society insignia there must be evidence of an integrity of character and an interest in the extracurricular life of the University as well as an acceptable personality. The Societies have memberships consisting of the outstanding men and women in the Day Colleges. Election to the honorary society is the highest honor that can be conferred upon an undergraduate.

## *Publications*

"*The News*"—A college newspaper, the *Northeastern News*, is published each week throughout the college year by a staff selected from the student body. The copy is prepared, edited, and published by the students themselves with the counsel of a faculty adviser. Opportunity is afforded for the students to express their opinions on subjects relating to study, cooperative work, social events, or topics of the day. Positions on the *News* staff and promotions are attained by competitive work. The paper is in part supported by advertising, both national and local, and in part by a portion of the student activities fee. The *Northeastern News* is a member of the Eastern Intercollegiate Newspaper Association, and sends one of its editors to the annual convention of this association each year. Copies of the *News* are mailed to upperclassmen when they are at cooperative work and to freshmen after the close of their college year.

"*The Cauldron*"—The combined senior class publishes annually a college yearbook, *The Cauldron*. It is ready for distribution in the latter part of the second term and contains a complete review of the college year with class histories, pictures of all seniors, of the faculty, and of undergraduate groups, as well as a miscellany of snapshots and drawings contributed by students.

## *Student Council*

Student government of the Day Colleges at Northeastern University is vested in the Student Council, composed of elected representatives from the various classes. The Council is the authority on all matters relating to student policies not definitely connected with classroom procedure. It has jurisdiction, subject to faculty approval, over all such

matters as customs, privileges, and campus regulations. The Dean of Students serves as faculty adviser to the Student Council.

## *Student Union*

The purpose of the Northeastern Student Union is to carry out the work of a Christian association within the University. It endeavors to deepen the spiritual lives of Northeastern men and women through the building of Christian character, to create and promote a strong and effective Northeastern University spirit in and through a unified student body, to promote sociability, and to emphasize certain ethical, social, civic, intellectual and avocational values.

All students are encouraged to participate in the activities of the Union, no matter what their religious faith, as the work of the Union is entirely nonsectarian. A good moral character is the only requirement for eligibility to membership. It is hoped that as many students as can will participate in this ideal extracurricular work.

The Union conducts a weekly Chapel Service in the little chapel in Richards Hall, to which all faculty members and students are invited. The service, which is nonsectarian and voluntary, is held on Thursday mornings from 8:40 to 8:55 o'clock. Many eminent preachers of Greater Boston are engaged to deliver brief addresses.

## *Professional Societies and Clubs*

To assist in the promotion of social, cultural, and intellectual advancement through informal channels, a number of professional societies and clubs are sponsored.

*Camera Club*—The Camera Club welcomes all men and women interested in photography. Weekly discussions and special evening lectures by guest artists are part of the yearly program. Field trips, monthly photo contests and a general exhibition add to the interest and progressive work of this organization.

*Chess Club*—The Chess Club gives both beginners and experts an opportunity to enjoy the game. Yearly tournaments are held among the members and, in past years, the best among the members have engaged in intercollegiate competition.

*Debating Society*—The purpose of the Debating Society, formed in 1936, is "to foster and promote an interest and facility in formal argumentation; to develop an impartial, unbiased, and intellectual consideration of questions and issues of current interest; and to sponsor intercollegiate relationships and competition in the debating field." Membership is open to all students of the Day Colleges.

*Dramatic Club*—The Dramatic Club affords an opportunity for those students interested in dramatics to participate in the production of several pieces in the course of the college year. Qualification for the cast

and for positions on the business staff is through competition under the direction of the faculty adviser.

*Engineering Societies, National*—Students in the several professional curricula of the College of Engineering operate Northeastern University Sections of the appropriate national professional societies. Chief among these are the following:

American Society of Civil Engineers
Boston Society of Civil Engineers
American Society of Mechanical Engineers
American Institute of Electrical Engineers
American Institute of Chemical Engineers
Society for the Advancement of Management
American Chemical Society

Members of the engineering faculty who hold membership in the parent organizations serve as advisers to these student groups. Meetings are held regularly, usually at night so that students from both divisions may attend, and practicing engineers are invited to address the sections. Occasionally appropriate motion pictures are shown, or the group visits some current engineering project in the vicinity of Boston. The College of Engineering encourages these student sections of the technical societies in the belief that they provide a wholesome medium for social intercourse as well as a worthwhile introduction to professional life.

Membership in the student sections of the American Society of Civil Engineers and Boston Society of Civil Engineers, the American Society of Mechanical Engineers, or the American Institute of Electrical Engineers also includes membership and privileges of the Engineering Societies of New England. This organization is an affiliation of all the major technical societies of Boston and vicinity and provides valuable lectures, smokers, and informal meetings with the outstanding men engaged in engineering work in Boston and vicinity.

*Finance and Insurance Club*—The purpose of the Finance and Insurance Club is to increase among its members the knowledge of the theory and practice of finance and insurance. Any student of Northeastern University while enrolled in any of the finance and insurance courses of the College of Business Administration is eligible to active membership in this club. Meetings are held each ten-week period at which executives from Greater Boston are invited to discuss current issues in the field.

*Industrial Relations Club*—Membership in the Industrial Relations Club is open to all students of Northeastern University who may be enrolled in any of the industrial relations courses of the College of Business Administration. The purpose of this club is to increase among its membership the knowledge of the theory and practice of industrial relations. Prominent executives from the Greater Boston area discuss current issues in this field at the meetings which are held in each ten-week period.

*International Relations Club*—The International Relations Club was founded in 1932 for the purpose of studying and discussing those current national and international events and issues which vitally concern our American life and institutions.

It is the intention of the club to deal with all questions in an impartial and broadminded manner, and to take an intelligent and effective part in promoting international understanding and harmony. The club maintains contacts with similar organizations in other colleges.

Membership is not open to freshmen, and only to those upperclassmen who maintain good scholarship.

*Law and Accounting Club*—All students interested in accounting and law are invited to join this stimulating club. Problems and cases involving the interrelations of accounting and law are presented and discussed at club meetings. Although upperclassmen usually present problems arising out of thesis or co-operative work, speakers from the professional world come to the meetings to present papers and lead the student discussion.

*Marketing and Advertising Club*—The purpose of the Marketing and Advertising Club is to increase among its members the knowledge of the theory and practice of marketing and advertising. Any student of Northeastern University while enrolled in any of the marketing and advertising courses of the College of Business Administration is eligible to active membership in this club. Meetings are held each ten-week period at which executives from Greater Boston are invited to discuss current issues in the field.

*Mathematics Society*—The Mathematics Society encourages the study of topics of mathematical interest which are either outside or beyond the scope of the regular mathematics courses. Membership is restricted to those men and women who have completed one- and one-half years of study in mathematics and have an average grade of not less than "C" in mathematics courses up through differential calculus. The club meets once every five weeks in the evening. Although membership is limited to upperclassmen, any student is always welcome to any meeting, and freshmen especially interested in mathematics are always welcome.

The final program of the year is devoted to a dinner meeting for which some prominent outside speaker is procured.

*Musical Clubs*—The Department of Student Activities sponsors musical clubs, such as the following: a concert orchestra, a band, a glee club, a banjo club, and a dance orchestra, for which all students with musical ability are eligible. Membership in the various musical clubs is attained by competitive effort.

Each organization has a faculty adviser and each elects a representative to the Musical Clubs Council. The purpose of this council is to coordinate the various musical activities of the Day Colleges. At the annual Musical Clubs Banquet, held early in the spring, charms are awarded

to the leaders and managers of the several clubs and to members who have played over a period of three full years.

*Omega Sigma Society*—This club was organized in 1943 for all women students enrolled in the Day Colleges, to derive social, moral and intellectual benefits for both themselves and the University.

*Radio Club*—One of the most popular undergraduate activities is the Radio Club. Members are provided opportunity for code practice and are encouraged to obtain their amateur licenses. The club owns and operates station W1KBN, a short wave transmitter, located in the Radio Laboratory in the penthouse of Richards Hall. Meetings are held about once a month for the discussion of technical matters. Practicing radio engineers are frequently invited to address the club at evening meetings, when students in both divisions may attend.

*Science Club*—Membership in the Science Club is open to students who maintain satisfactory scholastic standing. The club has access to machine shops for the construction of telescopes and other instruments. It also has quarters in the penthouse on the fifth floor of Richards Hall.

*Yacht Club*— Only recently formed, the Yacht Club is a member of the Intercollegiate Yacht Racing Association. The club participates in regattas held in the Charles River Basin and also in regattas held at other colleges.

## *Class Organization and Activity*

Each of the classes in the Day Colleges elects its officers and carries on activities as a class. Dances are sponsored by the classes at regular periods throughout the year. One of the high lights of the social program is the Junior Promenade, held each spring at one of the Boston hotels.

Seniors plan a number of activities just prior to Commencement.

## *Convocations*

The hour from 12:00 to 1:00 on Wednesdays throughout the year is set aside for convocations. Attendance is complusory. Arrangements are made to bring before the student body some of the ablest and foremost thinkers of the day. A list of speakers for the year will be found on page 16 of this catalog. When the convocation hour is not occupied by a University lecturer, class meetings, concerts, or athletic rallies are held instead. Such gatherings are under the direction of the Department of Student Activities.

## *Fraternities*

There are at present nine local Greek letter fraternities chartered by Northeastern University. Each fraternity is provided with a faculty adviser who is responsible for the proper administration of the fraternity

house under the rules and regulations established by the faculty. The list of fraternities in the order of their establishment is as follows:

1. Beta Gamma Epsilon
2. Alpha Kappa Sigma
3. Nu Epsilon Zeta
4. Sigma Kappa Psi
5. Phi Beta Alpha
6. Phi Gamma Pi
7. Sigma Phi Alpha
8. Kappa Zeta Phi
9. Gamma Phi Kappa

Elected representatives from each fraternity make up an Inter-Fraternity Council, a body which has preliminary jurisdiction over fraternity regulations. Its rulings are subject to the approval of the Faculty Committee on Student Activities.

# The Co-operative Plan

## What It Is

The Co-operative Plan of Education is founded on the educational philosophy that supervised employment in the occupational field for which a student is training enhances comprehensive learning and vocational adaptation. It utilizes, in addition to the usual classroom and laboratory exercises, the practical values of the work-a-day-world environment, thereby enabling the student not only to become acquainted with certain job skills and operations concurrently with his academic training but also to develop his confidence and capacity to arrive at intelligent conclusions based upon a knowledge of practice as well as of theory.

## How It Works

The Co-operative Plan works in the following manner. Upperclassmen, including both men and women, are divided into two nearly equal groups, one of which is called Division A and the other Division B. Each student is assigned a job with some business or industrial concern. The Division A students start the college year with a term of classroom work, while the Division B students start the year with a term at co-operative work. At the end of that term, the Division A students go out to work with a co-operating firm, while their places in the classrooms are then taken by their alternates, the corresponding Division B students. When the next term has passed the Division A students return to college and the Division B students return to the co-operative job. The alternation of work and classroom study continues throughout the year so that an upperclassman has usually two terms of ten weeks and one of five weeks at college, two terms — one of ten weeks and one of fifteen weeks — at co-operative work, and a brief vacation.

## Faculty Co-ordinators

Each student is assigned to a co-ordinator who is responsible for all phases of the co-operative work program for his group of students. He interviews them during the freshman year and discusses with them various vocational objectives and answers such questions as the students may have in regard to the many activities of business and industry. He studies them in the light of their physical condition, scholastic attainment, interests, aptitudes, and other factors bearing upon their qualifications for vocational assignment. These interviews culminate in an agreement between the students and their co-ordinators regarding the field of co-operative work in which the students are placed. During each of the terms at college immediately succeeding a term at co-operative work, the co-ordinator confers with the student concerning the job experiences acquired and other matters relating to vocational adjustment or personal problems while on the job. The reports of the employer on the achievements and performance of the student are discussed and interpreted in

the interest of further co-ordination and more effective learning. In this way the progress of all students is observed and co-ordinated with their college work to the end that maximum values are obtained from their training at Northeastern.

### *Placement*

The co-ordinator visits co-operating firms and arranges with them for the employment of students under his charge. The range of opportunities available to Northeastern students is wide, including practically all phases of industrial life. In general, the first year of co-operative work can be expected to be of a routine nature through which students may prove their fitness for more responsible work. A job assignment directly related to the student's field of study and vocational training is the prime objective of the co-ordinator. The jobs upon which Northeastern students are employed are in no sense protected opportunities. They are regular jobs under actual business conditions and are held in competition with other sources of supply. The only special privilege accorded Northeastern students is that of attending college on the Co-operative Plan and the opportunity to merit by superior performance progressive advancement on the job.

### *Supervision and Guidance*

While the University does not adopt a paternal attitude toward co-operative work, it nevertheless assumes certain responsibilities toward students and co-operating firms. Co-ordinators visit each job in order that the employer may report upon the student's achievement and that necessary adjustments may be made. Co-ordinators supervise the assignment of students to various jobs and in conjunction with employers arrange for promotions and progressive training schedules. Problems that arise on co-operative work are adjusted by common agreement of co-ordinator, student, and employer. In the event of special difficulties or dissatisfaction, the case may be adjusted by the Committee on Co-operative Work, which comprises several members of the faculty.

Through a series of co-operative work reports prepared during their working periods, students are led to analyze their jobs and to develop a thoughtful and investigative attitude toward their working environment. A most important phase of co-operative work is the opportunity afforded for guidance by the frank discussion of actual problems encountered on the job. The intimate contact between co-ordinator and student is of great worth in helping the student to get the most value from the co-operative work assignment. While the University endeavors to provide every possible opportunity for its students, it expects them at the same time to take the initiative and to assume the responsibility involved in their individual development. To every student are available the counsel and guidance of the faculty, and every resource at its disposal. But the faculty does not coerce students who are uninterested or unwilling to think for themselves.

The Co-operative Plan is thus designed specifically to provide actual working opportunities which afford the students practical experience,

give meaning to their program of study, and train them in reliability, efficiency, and teamwork.

### *Correlation of Theory and Practice*

Co-operating companies employ the students, both men and women, in the various departments of their establishments. The training is thorough. To derive the greatest value from co-operative work the student is advised to continue in the employ of the co-operating firm for at least one year after graduation, since certain types of work which would afford valuable experience cannot be made available during the alternating period of work and study. Statistics compiled over a period of many years show that an average of from thirty-five to fifty per cent of each graduating class remains with co-operating employers after graduation.

### *Co-operative Work Reports*

The values to be derived from practical experience are further enhanced by required report writing. These co-operative work reports are written during the working periods by all co-operative students. A complete job analysis is required as the first report written on any new co-operative work assignment. Subjects of other reports are selected by the student after conference with the Co-ordinator of Co-operative Work, by whom they must be approved. The reports are designed to encourage observation and investigation on the part of the students and to help them to appreciate more fully the extent and value of their experience. These reports are carefully read by the co-ordinator and are discussed with the student during the following college period. Exceptionally valuable results are obtained from these reports. The value derived must necessarily be directly proportional to the conscientious and intelligent concentration of effort by the student upon this phase of the work.

### *Co-operative Work Records*

Complete and detailed records are kept of the co-operative work of each student. They are based upon reports made by the employer at the end of each working period; upon occasional personal conferences between the employer and the co-ordinator; and upon various evidences of the student's attitude toward all the phases of his co-operative work. It is not possible for the student to secure a degree unless this part of the curriculum is completed satisfactorily. These records of practical experience serve as a valuable reference for future Alumni Placement.

### *Positions Available*

Because of uncertainties of business conditions, as well as other reasons beyond its control, the University cannot and does not guarantee to place students. However, past experience has demonstrated that students who are willing and capable of adapting themselves to existing conditions are almost never without employment except in periods of severe industrial depression.

## *Earnings*

It should be understood that the primary purpose of the Co-operative Plan is training. The rates of pay for students tend to be lower than might reasonably be expected on full-time productive types of jobs such as would ordinarily be available to youth of corresponding age and training, because students are given the privilege of attending college on the Co-operative Plan and because the purpose is to provide the student with the opportunity of advancing on the job concurrently with his academic progress. Frequently this involves transfer, at reasonable intervals, from one department to another of the co-operating company.

## *Location of Work*

It is the policy of the University to assign students to co-operative work within commuting distance of their homes. This is not always possible, however, and at times it may be necessary for students to live away from home in order to obtain satisfactory and desirable co-operative work assignments.

## *Types of Co-operative Work*

In so far as possible students are placed at co-operative work in that general field for which they express preference, provided that aptitude, physical ability, temperament, and other personal qualities appear to fit them for this field. Usually students are placed first in those jobs of an organization where they may learn the fundamental requirements of the business.

For example, the first year of training in a manufacturing establishment might be as an operator of machines in two or more production departments of the plant. This provides the opportunity to acquire intimate knowledge of the equipment, methods, and operations of some of the processing departments of raw materials and products in process of manufacture. The second year might be as an expeditor or on assignments with the maintenance and installation department. Such work would require contact with all of the several production and operating departments of the plant and would provide the opportunity for a comprehensive and correlated study of all operations, plant layout, routing of raw, semi-processed, and finished materials —in other words, a perspective view of the interrelationship of departments. By this time, the student will have progressed to the academic stage where "application" courses will be included in the program and the next year of co-operative work might be devoted to testing, inspecting, methods analysis or the like. The last year would be devoted to initial training in that department for which the student was aiming to ultimately qualify. Thus, in the course of a period of four years of co-operative training, the student would have the opportunity to acquire a substantial background in at least some of the functions of the factory administration. This progressive type of training is ordinarily obtained in the employ of one company. A change of company each year usually provides more a change of environment than a progression of experiences.

Engineering firms, manufacturing companies, public utilities, banks, insurance companies, railroads and many other types of enterprises employ Northeastern co-operative students. Definite training schedules have been established with several of the co-operating companies. The ultimate objective of such schedules is absorption of the graduates into the permanent employ of the company, although such absorption is based on merit rather than guarantee.

## *Types of Co-operative Training Schedules*

These schedules are arranged with the basic idea of giving the student a comprehensive training through the several different departments, but must of necessity be varied in accordance with the needs of those departments.

### BOSTON EDISON COMPANY

The schedule of the Boston Edison Company is divided into the following general classifications. Very few co-operative students obtain experience in all branches, but students progress from year to year in the respective branches as conditions permit.

*Standardizing*

(*a*) Testing and standardizing of electrical instruments
(*b*) Miscellaneous standardization
(c) Repairs on electrical instruments
(*d*) Laboratory high voltage tests

*Steam Practice*

(*a*) Turbine, engine and boiler tests
(*b*) Instrument tests and repairs
(c) Miscellaneous tests

*Electrical Testing*

(*a*) Testing and repairing of electrical instruments in power stations and substations
(*b*) Cable tests
(c) High voltage tests on apparatus and in the field
(*d*) Checking up construction work
(*e*) Miscellaneous electrical tests

*Chemical Engineering*

(*a*) Fuel analysis
(*b*) Miscellaneous tests and analysis of oils, water, paints, and other materials

*Photography*

*Office Work*

### HUNT-SPILLER MANUFACTURING CORPORATION

ONE YEAR General laboratory and plant work, including preparation of samples
Pyrometry
Use and care of metallurgical apparatus
ONE YEAR Complete analysis of coal, coke, limestone, sand, iron, soil, etc.
ONE YEAR Keeping of general metallurgical records, filing, and making of reports
ONE YEAR Analysis for combined, graphitic, and total carbon with a complete knowledge of a carbon combustion apparatus

### PEPPERELL MANUFACTURING COMPANY

ONE YEAR Stock Records
ONE YEAR Production Analysis
ONE YEAR Inventory Control

# General Information

## College Expenses

### Tuition and Fees

*Freshmen* — The charge for tuition for all freshmen is $125 per ten-week term.

*Upperclassmen* — The charge for tuition for all upperclassmen is $150 per ten-week term and $75 per five-week summer term.

All students, both freshmen and upperclassmen, pay an annual University Activities Fee of $25. This is payable with the first payment of tuition each year.

### *Schedule of Tuition and Fee Payments, 1947-1948*

FOR FRESHMEN

| DIVISION A | *Tuition and Fees* | DIVISION B |
|---|---|---|
| September 4, 1947 | $150 | November 13, 1947 |
| November 17, 1947 | 125 | January 26, 1948 |
| January 26, 1948 | 125 | April 5, 1948 |

FOR UPPERCLASSMEN (Co-operative Plan)

| DIVISION A | *Tuition and Fees* | DIVISION B |
|---|---|---|
| September 8, 1947 | $175 | November 17, 1947 |
| January 26, 1948 | 150 | April 5, 1948 |
| August 9, 1948 | 75 | June 14, 1948 |

FOR UPPERCLASSMEN (Full-time Plan)

| | *Tuition and Fees** |
|---|---|
| September 8, 1947 | $175 |
| November 17, 1947 | 150 |
| January 26, 1948 | 150 |

*These payments cover three ten-week terms of instruction. Students who elect to continue for a fourth term pay an additional $150 on April 5, 1948.

### *University Activities Fee*

All students are charged each college year a University Activities Fee of $25 which is used for the operation of an extracurricular University program so designed as to meet in the best possible manner the recreational, health, social and cultural needs of the students. This fee supports such activities as dramatics, musical clubs, the Student Union, intramural games and sports, and intercollegiate athletics; includes membership in the Northeastern University Athletic Association and subscription to the *Northeastern News*, the college newspaper. Seniors receive a copy of the yearbook called the *Cauldron*, which is financed in part under this fee.

The University Activities Fee also covers the services of the college physician for emergency attention and general medical advice. Minor ailments are treated by the college health officers without additional charge. Any student who shows signs of more serious illness is immediately advised to consult a specialist or return home in order to receive further treatment.

## *Chemical Laboratory Deposit*

*(Applied only to students taking chemistry and chemical engineering laboratory work.)*

Freshmen taking chemistry make a Chemical Laboratory deposit of fifteen dollars ($15) at the beginning of the year from which deductions are made for breakage, chemicals, and destruction of apparatus in the laboratory.

All upperclassmen taking chemistry or chemical engineering laboratory work are required to make a deposit of ten dollars ($10) at the beginning of the first term and ten dollars ($10) again at the beginning of the second term in any upperclass year.

Any unused portion of this deposit will be returned to the student at the end of the college year. If the charge for such breakage, chemicals, or destruction of apparatus is more than the sum deposited, the student will be charged the additional amount.

## *Deferred Payment Fee*

There will be a $2.00 deferred payment fee added to all bills which are not paid by the Saturday following the date on which payments fall due. When further extensions of time are given on payments which have been previously deferred, an additional $2.00 fee may be charged for each extension.

Failure to make the required payments on time, or to arrange for such payments, is considered sufficient cause to bar the student from classes or suspend him from co-operative work until the matter has been adjusted with the Registrar.

## *Late Registration Fee*

A fee of $5.00 will be charged for failure to register in accordance with prescribed regulations on the dates specified in the college registration bulletins.

## *Graduation Fee*

A fee of ten dollars ($10) covering graduation is required by the University of all candidates for a degree. This fee must be paid before the end of the seventh week of the second term in the senior year.

## *Payments*

All payments should be made at the comptroller's office which is located on the first floor of Richards Hall. Checks should be made payable to Northeastern University.

## *Refunds*

The University provides all instruction and accommodations on an academic term basis; therefore, *no refunds are granted except in cases where students are compelled to withdraw on account of personal illness or to enter the armed forces of the nation.*

## *Expenses*

The following tables, compiled from expense returns submitted by the student body, give an idea of freshman expenditures under ordinary conditions.

### *Estimated College Expenses for a Freshman*

| | |
|---|---|
| Application Fee | $ 5.00 |
| Tuition and Fees | 400.00 |
| Chemical Laboratory Deposit | 15.00 |
| Books and Supplies | 40.00 |
| | $460.00 |

(*Engineering students should add approximately $30 for drawing instruments and equipment.*)

### *Estimated Living Expenses Per Week for a Freshman Residing Away from Home*

| | |
|---|---|
| Room Rent | $ 4.00– 6.00 |
| Board | 9.00–11.00 |
| Laundry | 2.00 |
| Incidentals | 2.00 |
| | $17.00–21.00 |

The figures given above are approximate and may not exactly apply to any one student; however, they will be found to represent fairly well the expense of a freshman who lives comfortably but without extravagance.

## *Policy on Changes of Program*

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

The University further reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

Any changes which may be made from time to time pursuant to the above policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

### *Textbooks and Supplies*

The Northeastern University Bookstore, located in the basement of Richards Hall, is a department of the University and is operated for the convenience of the student body. All books and supplies which are required by the students for their work in the University may be purchased at the Bookstore.

All students may purchase Day College textbooks which are for their own use at a ten per cent discount. The ten per cent discount will not apply on equipment, supplies, or novelties. It is the policy of the Bookstore, however, to stock these materials and to sell them at the lowest possible prices.

### *Part-Time Work*

Students who find it necessary to accept part-time jobs while attending college may obtain such work through the Director of Co-operative Work.

Students are not justified in assuming that the University will take care of their expenses or guarantee to supply them with work sufficient to meet all their needs.

A student should have available a reserve fund adequate to provide for immediate needs and unexpected contingencies. This should ordinarily amount to at least the first year's tuition plus books and supplies, room rent, and board for several weeks or a total of about $600.

## *Grades and Examinations*

### *Examinations*

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

### *Condition Examinations*

Condition examinations are usually given on the Saturday of the eighth week in each college term. The charge is three dollars ($3.00) for each condition examination. No student may take more than two condition examinations in any one term.

A student must petition to take a condition examination at least two weeks in advance of the date the examination is to be given.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

### *Senior Condition Examinations*

Condition examinations in first term senior courses will be offered during the second term senior examination period. No student will be allowed more than one such condition examination.

No condition examinations in second term senior courses are offered at the end of the second term. This means that a failure in a second term senior course cannot be made up before Commencement.

## *Grades*

A student's grade is officially recorded by letters, as follows:

- A superior attainment
- B above average attainment
- C average attainment
- D lowest passing grade, poor attainment (the faculty will accept only a limited amount of grade D work toward the Bachelor's degree)
- F failure, removable by condition examination
- FF complete failure, course must be repeated in class
- I incomplete, used for intermediate grades only to signify that the student has not had time to make up work lost through excusable enforced absence from class
- L used in all cases of the removal of a failure by condition examination or by attendance at summer term.

A student who does not remove a condition before that course is again scheduled, a year later, must repeat the course. A condition in more than one subject may involve the loss of assignment to co-operative work.

The responsibility for the removal of a condition rests with the student who is required to ascertain when and how the condition can be removed.

## *Dean's List*

A Dean's List, issued at the end of each term, contains the names of upperclass students who have an honor grade average in all subjects during the preceding period. Freshmen who achieve high scholastic standing are included on a Freshman Honor List, which is published at the end of each grading period. No student under disciplinary restrictions is eligible for either of the honor lists.

## *Reports on Scholastic Standing*

Freshman reports are issued at the end of each grading period; upperclass reports, at the end of each term. Questions relative to grades are to be discussed with the student's faculty adviser.

Students are constantly encouraged to maintain an acceptable quality of college work. Parents and students are always welcomed by the college officers and faculty advisers for conference upon such matters.

Parents or guardians will be notified whenever students are advised or required to withdraw from the University.

# General Conduct

## Conduct

It is assumed that students come to the University for a serious purpose and that they will cheerfully conform to such regulations as may from time to time be made. In case of injury to any building or to any of the furniture, apparatus, or other property of the University, the damage will be charged to the student or students known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the University.

Students are expected to observe the accepted rules of decorum, to obey the regulations of the University, and to pay due respect to its officers. Conduct inconsistent with the general good order of the University or persistent neglect of work may be followed by dismissal; if the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the University so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present any work which he or she has not performed, or to pass any examination by improper means, is regarded as a most serious offense and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

## Scholastic Year for Seniors

Seniors of either division who are candidates for a degree in the current year must have completed all academic work, class assignments, theses, regular and special examinations, before twelve o'clock noon of the Saturday next following the close of recitations for seniors.

## Attendance

Students are expected to attend all exercises in the subjects they are studying unless excused in advance. Exercises are held and students are expected to devote themselves to the work of the University between 9:00 A.M. and 5:00 P.M., except for a lunch period, on every weekday and from 9:00 A.M. to 1:00 P.M. on Saturday.

No cuts are allowed. A careful record of each student's attendance upon class exercises is kept. Absence from regularly scheduled exercises in any subject will seriously affect the standing of the student. It may cause the removal of the subject or subjects from a schedule.

Laboratory work can be made up only when it is possible to do so during hours of regularly scheduled instruction.

Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalties.

Attendance at all mass meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Director of Student Activities previous to the meeting from which absence is desired.

## Student Housing

### Housing Regulations

The University endeavors to exercise due consideration and care for the student's welfare while he or she is in residence. This necessitates the adoption of the rules and regulations presented herewith.

1. Assignments will be made when the student registers.
2. Students may inspect rooms before accepting an assignment; after reaching a decision students must notify the office of the Registrar, 254R.
3. Students who accept room assignments must retain them for the period of their residence, unless given permission by the Registrar to change.
4. Students are not permitted to live in unsupervised quarters. Under no conditions are groups of students permitted to lease apartments.
5. Students are not permitted to engage rooms without the prior approval of the University. Those violating this rule will be required to give up such rooms immediately and will be assigned by the University to approved quarters.
6. Violation of any of the above rules is considered a breach of discipline and will be dealt with accordingly.

### Dormitories

At present the University does not maintain dormitories and cannot guarantee housing accommodations to students who live away from home. Provision, however, is made to help students secure rooms in the vicinity. Many freshmen prefer to take room and board at the fraternity houses, which are all supervised by the University through faculty advisers. For information relative to such housing write the Director of Admissions.

Rooms in the dormitory of the Huntington Avenue Branch of the Boston Y.M.C.A. may be secured only through the Housing Department of the Y.M.C.A. The applicant must present himself in person to a representative of the Department before assignment will be made.

Applicants desiring to room in the Association dormitory are advised to write the Housing Department of the Huntington Avenue Branch, 316 Huntington Avenue, Boston, Massachusetts.

## Veterans at Northeastern University

Northeastern University is offering full co-operation in the educational program for veterans and all its resources have been made available for this purpose. Veterans who attend Northeastern are not segre-

gated from the rest of the student body nor in any way treated as a special group. This applies equally to veterans whose college expenses are being met by the Government with the natural exception that administrative details vary for this group.

All veterans are given every possible consideration in the readjustments they are experiencing in their return to normal civilian life. Returning veterans are welcome as individuals and their programs determined on the basis of previous educational background, experience, and employment objective. All University programs are open to qualified veterans. Returning servicemen are also urged to take part in all sports, class and extracurricular activities in order that they may participate in the full range of a normal well-rounded university life.

The Department of Admissions determines each applicant's potentialities for profiting from higher education. Once a veteran has been admitted to the University his progress is watched and aided by the regular University advisory system. In addition, the University has established a Veterans' Counseling Center which handles all relations between matriculated veterans and the Veterans Administration. The Center is also prepared to supplement the regular advisory system by providing for extra counseling service for all veterans who wish to avail themselves of it. Through testing and guidance, the Center helps veterans to uncover and develop their aptitudes and interests both educational and vocational.

# Freshman Counseling

## *Freshman Orientation Period*

In order that freshmen may be ready to pursue their academic work with greater composure and be somewhat acclimated before the beginning of scholastic work, three or four days prior to the first term are devoted to a freshman orientation period. During this time freshmen are advised as to choice of program, and assisted in every way possible in order that they may be prepared to begin serious study and work on the first day of the college term. All freshmen are required to attend all exercises at the University scheduled during the orientation period.

## *Physical Examination*

All freshmen receive a thorough physical examination at the University during the orientation period. All students are expected to report promptly at the appointed time for examination. Those who fail to appear at the appointed time will be charged a special examination fee of two dollars ($2.00).

## *Freshman Counselors*

At the time of matriculation each freshman is assigned to a personal adviser, a member of the faculty, who serves as an interested and friendly counselor during the perplexing period of transition from school to college. A personal record card is prepared for each student, containing certain pertinent data from the preparatory school record, the report of the physical examination at Northeastern, scores on pyschological tests, the results of placement examinations, and any special notes which may be of significance in counseling work. The aim of the freshman advisory system is primarily to assist students in making an effective start upon their programs and secondarily to acquire for the later use of guidance officers a fund of significant information relative to every freshman. Counseling is under the direction of the Dean of Students, assisted by a clinical psychologist, who handles the diagnosis and remedial treatment of difficult problem cases. Direct counseling of women students is under the supervision of a woman member of the staff with the title, Adviser for Women Students.

## *Individual Attention to Freshmen*

Not only is attention given to the scholastic problems of the student, but also to personal problems in which advice is needed and desired. The aim is to guide the student to the fullest possible personal development.

The college records of all students are carefully analyzed in the light of what may reasonably be expected from them in view of their previous school record, their scores on psychological tests, and all other factors in their situations. If they are not doing their best work, investigations are made to determine and eliminate the causes. If they are doing as well as could be expected, or better, they are encouraged to continue their efforts. In other words, each student is held to the best work possible, through advice, encouragement, and assistance.

# Scholarships, Prizes and Awards

## Trustee Scholarships

Established in 1928 by the Board of Trustees of Northeastern University. Each year the University grants in the three Day Colleges twenty-five full tuition scholarships to entering freshmen who have demonstrated throughout their preparatory or high school course superior scholastic attainment. For additional information relative to these scholarships communicate with the Director of Admissions.

## Charles Hayden Memorial Scholarships at Northeastern University

Established in 1939 through the generosity of the Charles Hayden Foundation and subject to annual renewal. The Foundation, created by the will of the late Charles Hayden, an alumnus of the Boston English High School, offers annually a sum of money to be distributed as memorial scholarships at Northeastern University. The scholarships are awarded to "deserving boys" whose parents are unable to finance the entire cost of their education. To be eligible for consideration a student must have graduated from the English High School or from one of the following high schools in Boston and its metropolitan area: Arlington, Belmont, Boston (Brighton, Charlestown, Commerce, Dorchester, East Boston, English, Hyde Park, Jamaica Plain, Mechanic Arts, Public Latin, Roslindale, Roxbury Memorial, South Boston), Braintree, Brookline, Cambridge (High and Latin, Rindge Technical), Canton, Chelsea, Dedham, Everett, Lexington, Malden, Medford, Melrose, Milton, Needham, Newton, North Quincy, Quincy, Revere, Somerville, Stoneham, Wakefield, Waltham, Watertown, Wellesley, Weston, Weymouth, Winchester, Winthrop. Each recipient of a Charles Hayden Memorial Scholarship is presented a properly endorsed certificate and is eligible for membership in the Charles Hayden Scholars Club of the University. Full particulars concerning these awards may be obtained from the Director of Admissions of Northeastern University.

## Dean's List Scholarships

Established in 1929. Annually at the Dean's List Dinner three scholarships of one hundred dollars each, known as the Dean's List Scholarships, are presented to the students with the outstanding records in the sophomore, middler, and junior classes. These scholarships are applicable to the recipients' tuition the first term of the following year.

## President's Letter

Established in 1929. At the time of the award of the Dean's List Scholarships a President's Letter is presented to the senior student who leads the seniors in the Day Colleges in scholastic achievement. The letter is a congratulatory one from the President of the University and is a coveted prize.

### *Sears B. Condit Honor Awards*

Established in 1940 through the generosity of Sears B. Condit. In the fall of the year at a University convocation Sears B. Condit Honor Awards, not less than ten in number, are awarded to outstanding students in the upper three classes of the College of Liberal Arts, the College of Business Administration, and the College of Engineering. Students who have received the Dean's List Scholarships are not eligible for one of these Honor Awards. Each award carries a stipend of not less than fifty dollars as well as a certificate of achievement.

### *Boston Society of Civil Engineers Scholarship in Memory of Desmond FitzGerald*

Established in 1931 by the Boston Society of Civil Engineers in memory of Desmond FitzGerald, a former president of the Society and an eminent hydraulic engineer with a distinguished record of service. The scholarship is subject to annual renewal. It has been awarded annually since 1931 to an outstanding Northeastern University senior or junior student in the Department of Civil Engineering of the College of Engineering. The presentation is made by the President of the Boston Society of Civil Engineers at a College of Engineering convocation in the spring of the year.

### *Tau Beta Pi Award*

Massachusetts Epsilon Chapter of Tau Beta Pi Association, national honorary society in engineering, offers annually a scholarship of one hundred dollars to the freshman in the college who has, during the previous year, made the highest scholastic record.

### *The Sigma Society Award*

Established in 1930. The Sigma Society, the honor society of the College of Business Administration, offers annually a scholarship of one hundred dollars to the freshman in the college who has, during the previous year, made the highest scholastic record.

### *The Academy Award*

Established in 1938. The Academy, the honor society of the College of Liberal Arts, offers annually a scholarship of one hundred dollars to the freshman in the college who has, during the previous year, made the highest scholastic record.

### *Omega Sigma Award*

Established in 1944. The Omega Sigma Society, composed of women students at Northeastern University, offers annually a scholarship of one hundred dollars to the woman student who, by high scholastic attainment and by demonstration of the quality of leadership, has proven herself the outstanding woman student of the year.

### *Henry B. Alvord Memorial Scholarship in Civil Engineering*

Established in 1940 in memory of the late Henry B. Alvord, Professor of Civil Engineering and Chairman of the Department for eighteen years. The award is made annually to a student graduating from an accredited secondary school who has demonstrated superior academic ability and gives promise of succeeding in civil engineering. The grant of two hundred and fifty dollars is made only to an entering freshman who is qualified for and plans to study civil engineering.

### *William J. Alcott Memorial Award*

Established in 1934 by members of the faculty and other friends to perpetuate the memory of William Jefferson Alcott, Jr., a brilliant member of the Department of Mathematics in Northeastern University from 1924 until his death in 1933. The award is offered annually in the form of a prize purchased with the income of the fund for outstanding scholastic achievement during the preceding year, either in a particular field of interest or for a superior academic record.

### *Public Speaking Contest*

Established in 1922. Each spring the University conducts a Public Speaking Contest for which all students in the Day Colleges are eligible. Prizes of forty, thirty, twenty, and ten dollars respectively are awarded to the four winning speakers in a contest before the upperclass student body assembled in a general mass meeting. Speeches are original in nature and about ten minutes in length. The judges base their decision on appropriateness of subject, content, and delivery. Preliminary contests are held during the winter in each division.

# The Alumni Association

The Alumni of the Day Colleges are organized to promote the welfare of Northeastern University, to establish a mutually beneficial relationship between the University and its alumni, and to perpetuate the spirit of fellowship among members of the Alumni Association.

The work of the General Alumni Association is supplemented by the activities of regional alumni clubs located throughout the East and Middle West. The local clubs meet periodically in their respective centers to discuss matters pertaining to the University and its alumni. Meetings are also held in conjunction with the visits of Northeastern's athletic teams to the various club centers.

The Association sponsors the Alumni Fund, through which the University receives an annual gift to assist in the development of the University. A number of committees of the Alumni Association perform valuable services to the University such as assisting in the work of the Placement, Admissions, and Student Activities departments.

Two large social functions are sponsored each year, the Fall Homecoming Day and the Annual Alumni Day held in conjunction with the June Commencement. Reunions of various classes are also conducted in June.

The Alumni Association of the Day Colleges is a member of the Alumni Federation, the All-University Alumni organization including the Alumni Association of the School of Business and the School of Law.

## *Officers*

*President*
RAYMOND W. JAMES, '32

*Vice-President*
DOUGLASS F. TULLOCH, '24

*Secretary*
EDWARD V. KIRKLAND, '35

*Treasurer*
JOHN E. VADALA, '31

### *Executive Committee*

RICHARD B. BROWN, '22
JOHN W. LABELLE, '32
BERNARD H. CAPEN, '20
FREDERICK S. BACON, JR., '36
HOWARD C. COOKINGHAM, '34
C. FREDERICK HEDLUND, '25

### *Director of Alumni Relations*

RUDOLF O. OBERG, '26

### *Assistant Director*

J. RICHARD BROWN, '48

### *Class Representatives*

1917 — PERRY F. ZWISLER
1919 — JAMES A. KNOWLTON
1920 — W. ARNOLD SCHALLER
1921 — J. MARTIN BROWN
1922 — FRANK L. FLOOD
1923 — ALTON L. DOUGLAS
1924 — ARTHUR W. FERGUSON
1925 — WILBERT H. CONNOR
1926 — CARL S. WOLFRUM
1927 — WARNER C. DANFORTH
1928 — EARL R. GRANT
1929 — THOMAS A. PINKHAM
1930 — ROBERT F. WALKER
1931 — HARRY GILL
1932 — LEONARD F. COLPITTS
1934 — NOBLE L. DAVIS
1935 — ALAN M. NORLING
1936 — FRANK H. CLARK
1937 — JOSEPH M. CHRUSZ
1938 — RAY F. HENDERSON
1939 — GUSTAV ROOK
1940 — CALVIN S. CRONAN
1941 — CHARLES W. BARBOUR
1942 — WILLIAM W. ROBINSON
1943 — RICHARD M. HATCH, JR.
1944 — CALVIN A. KING
1945 — SIDNEY AUSTIN
1946 — RODERIC W. SOMMERS
1947 — RICHARD W. GREENWOOD
1948 — FRANCIS J. MASTROPIERI

# NORTHEASTERN UNIVERSITY

## COLLEGE OF

# LIBERAL ARTS

*Admission Requirements and Courses of Study*

1947-1948

(CO-EDUCATIONAL)

BOSTON 15, MASSACHUSETTS
JANUARY, 1947

# THE COLLEGE OF LIBERAL ARTS

## *Aims*

IN PROVIDING the means to a modern liberal education the College of Liberal Arts of Northeastern University has a threefold objective: first, the development of intellectual capability; second, the development of a well-rounded personality; and third, preparation for a vocation.

Intellectual capability rests upon the foundation of a sound general education. Through the required and elective courses of all curricula, students are guided toward a mastery of the leading ideas, significant facts, and the habits of thought and methods of work in the areas of language, natural science, social science, and the humanities. With this training the student will better understand the world and society in which he lives, appreciate more fully the basic values upon which civilization and culture rest, and perceive and accept his responsibilities as an active participant in social groups — the family, the community, the nation and the world. At the same time the student is aided in the development of a resourceful and independent mind, the ability to use as well as to accumulate knowledge, and the awareness of his mental strengths and weaknesses.

The College of Liberal Arts endeavors to aid each student in attaining the goal of an emotionally balanced, well-rounded personality. Through its academic, extracurricular, and co-operative work programs, students are provided experiences which will be conducive to the development of strength of character and a sense of personal responsibility — including such personal qualities as self-reliance, integrity, perseverance, and the ability to work with others.

Since liberal arts colleges were originally established for the purpose of training for certain professions, the College of Liberal Arts holds that there is no inconsistency between a truly liberal education and preparation for a vocation. Today it is widely accepted that a liberal education must prepare both for the art of living and the obtaining of a living. Through its academic program coupled with co-operative work experience the College of Liberal Arts aims at providing young men and women with a sound training either for further graduate study or for immediate entrance upon graduation into some vocation.

# Methods

To enable each student to plan a college program in keeping with his own interests and aptitudes, a wide range of electives is offered. This does not mean that students are free to elect courses indiscriminately, for if they are to obtain a liberal education they must have training in several basic fields. Therefore, a definite series of basic courses in each curriculum is required by the faculty. These required courses are largely concentrated in the first two years of the curriculum.

Through a comprehensive guidance program students are directed in their selection of courses so that they obtain the proper preparation for their intended vocations. Specialization in a major field is emphasized during the latter part of the curriculum and is facilitated by the opportunity for electing certain courses in the College of Engineering and the College of Business Administration.

Through the Northeastern plan of co-operative education for upperclassmen, the student makes early contact with actual working conditions and profits by the wholesome experience of earning at least part of the money to defray college expenses. Viewed as a whole, then, the college years surround the student not with an artificial atmosphere of cloistered scholarship but with an environment very close to that which he or she will enter after graduation, and thus tend to make for more ready employment, an essential element of vocational competence.

## *Evening Courses*

In order to provide employed men and women with opportunities in liberal arts education, a number of the regular courses are offered during the evening. These courses are designed for three groups of young men and women who are secondary school graduates and qualified for entrance to the college: (1) those who wish to prepare for admission to the School of Law, (2) those who wish to pursue a cultural program leading to the title of Associate in Arts, (3) those who do not wish to follow a specific program but desire to take courses to improve their cultural background.

The evening courses are arranged in a three-year program which meets one-half the semester hour requirement for the A.B. or S.B. degree and leads to the degree of Associate in Arts.

# Preparation for a Career

The curricula in the College of Liberal Arts afford not only a broad cultural training but also the necessary foundation for a wide range of vocations for both young men and young women. Some of the career opportunities open to the graduates of the College of Liberal Arts together with the academic programs needed are indicated below and in the pages which follow.

*Business*—The value of a liberal arts preparation for a business career is clearly shown by the fact that a very large proportion of all graduates of liberal arts colleges enter business. Within recent years there has arisen an increasing demand for liberal arts graduates by the largest and most progressive corporations in the country. For their training programs in manufacturing, merchandising, selling, and other fields many companies are seeking adaptable young men and women with the breadth of background of a liberal arts education.

Students planning either to go to a graduate school of business administration or to enter business directly upon graduation should major in economics and should elect courses in English, government and psychology. A limited number of specialized courses in the College of Business Administration such as advertising, business law, finance, industrial management, insurance, investments, marketing, and merchandising may be taken by students who have had the necessary prerequisites.

*Biological Sciences*— Students who major in biology can arrange programs which will lay the foundation for the following careers: teaching, dentistry, medicine (see premedical curriculum), veterinary medicine, public health, sanitation and laboratory methods; research in biology with universities, private research institutions, and governmental agencies under state and federal control; agriculture; and professional work in zoology and its applied fields such as fisheries, animal husbandry, and biological survey, etc. Graduate study is essential for most of these careers.

*Chemistry*—Chemistry is rapidly approaching the status of a profession as shown by the recent action of the American Chemical Society in laying down specifications for approved undergraduate training in chemistry. Students who choose a chemistry major at Northeastern, a program accredited by the American Chemical Society, will be prepared upon graduation to become junior chemists in industrial, commercial, or governmental chemistry laboratories. The same program provides a thorough foundation for graduate study in chemistry.

*Dentistry*—The minimum requirement for admission to dental schools is two years of preliminary study in an approved college. Since the requirements of individual dental schools vary, students should familiarize themselves with the specific requirements of the schools in which they

are interested. For most dental schools a candidate for admission must offer at least one year of work in English, physics, and biology, and one and one-half years of work in chemistry including organic chemistry.

Predental students at Northeastern will be able to meet these requirements by taking the two-year predental program.

*Government Service*—Government service is a very comprehensive term since the numerous activities of modern government require all types of trained workers. For more and more of these positions a college education is essential as shown by the fact that only college graduates are eligible to take many civil service examinations today. Recently the United States Civil Service Commission has inaugurated examinations for graduating seniors as Junior Professional Assistants in such fields as biology, business analysis, economics, editing, examinations (for majors in psychology), fiscal analysis, mathematics, physics, social work, and statistics.

The distinctive governmental career field is that of public administration since the need for college trained personnel in administrative governmental posts of all types, political or nonpolitical, is being increasingly recognized. While graduate training is desirable, an undergraduate program with a major in history-government and a minor in economics will provide the necessary foundation for a career in government service at home or abroad.

*Journalism*—Many of the nation's leading editors now advise students preparing for a career in journalism to obtain a broad liberal arts education rather than to concentrate on specific training in the routines of journalism in their undergraduate programs. It should be observed that opportunities in journalism today are not restricted to the urban or rural newspaper fields. Publishing houses, trade journals, house organs, advertising departments and agencies, and the various types of public relations work need college graduates with the same basic training.

Students who desire to enter journalism should choose the English-journalism major with a minor in economics, history, or government. They may elect courses in advertising in the College of Business Administration.

*Law*—Effective September 1, 1938, by a ruling of the Supreme Judicial Court of Massachusetts, in order to be eligible for admission to the bar an applicant must have completed certain general educational requirements before beginning a legal education. Briefly, this general education must comprise graduation from a four-year high school and the completion of not less than half of the work accepted for the Bachelor's degree in a college approved by the Board of Bar Examiners.

The College of Liberal Arts offers two programs of prelegal study designed to meet the above requirements. One of these programs is specifically adapted to the needs of full-time day students. This program enables the student to meet one-half the requirements for the Bachelor's degree in two years of full-time study. It provides the basic background

in English, economics, government, and history recommended for the prospective student of law.

The other prelegal program is designed to meet the needs of employed men and women. It is provided by offering a number of the regular courses during the evening and requires three years for completion.

*Law—Liberal Arts (Combined Program)*—The combined curriculum in the College of Liberal Arts and the School of Law enables students to reduce by one year the time ordinarily required for obtaining the A.B. or S.B. and the LL.B. degree. Students who have completed before entering the School of Law a total of 168 credit hours of academic work of which at least 112 must have been earned in the Northeastern University College of Liberal Arts, and who have fulfilled all other graduation requirements, will receive the A.B. or S.B. degree upon the satisfactory completion of the full first year program in the Day Division of the School of Law. Students who enter the Evening Division of the School of Law will be eligible for the first degree upon satisfactory completion of the full equivalent of the first year of the day Law School program.

In both instances the first degree will be conferred at the next Commencement following determination of eligibility for the first degree.

*Library Work*—Professional training for library work now demands at least one year of graduate study in a library school following a broad undergraduate foundation in liberal arts. While a major in English is usually advised, many opportunities are available for those who have concentrated in other fields.

*Medicine*—In order to be eligible for admission to a medical school according to the Committee on Education of the American Medical Association, a candidate must have attended an approved college and have included certain specific work in his program. The minimum course requirements include year courses in each of the following fields: English, inorganic chemistry, organic chemistry, physics, and a foreign language. Since some medical schools impose additional requirements, premedical students should obtain full information from the medical school of their choice about the courses which must be offered for admission.

The premedical curriculum listed on page 76 will enable students to meet all the above standard requirements. The electives make it possible to obtain any particular additional courses required by some medical schools.

Students are cautioned that the successful completion of the required premedical program by no means ensures admission to a medical school. Since most medical schools have far more applicants than they can admit, standards of selection are most rigorous and take into consideration not only the quality of the applicant's academic record and instructor's recommendations but also his or her medical-aptitude test score and the results of a personal interview.

*Ministry*—Preparation for the ministry today requires a theological school training following graduation from an approved college of liberal

arts. The American Association of Theological Schools states that the appropriate foundation for a minister's later professional studies lies in a broad and comprehensive college education and that the normal place for a minister's professional study is the theological school. Recommended fields of study include English, economics, education, government, history, foreign languages, one of the natural sciences, philosophy, psychology, and sociology.

While students who major in English, economics, psychology, or sociology will be able to arrange programs meeting the above recommendations, it is urged that preministerial students obtain counsel from the dean of the theological school of their choice since some schools have further specific requirements.

*Physics*—As a result of the rapid developments in physics in recent years, there are increasing opportunities in applied physics on the technical staffs and in the research laboratories of the electrical, radio, optical, and other industries for the liberal arts graduate who has majored in physics. Graduate study is necessary for those who plan on research in pure physics.

*Psychology*—There is an increasing demand for persons trained in psychology in a wide range of occupational fields. In the field of education the demand is expanding for school psychologists at the grade school level and for guidance workers and vocational counselors at the junior and senior high school level.

In the field of business and industry increasing numbers of psychologists are being employed in marketing research, in advertising, and in personnel departments. In state and federal governmental agencies clinical psychologists are employed in hospitals for the mentally ill, in child guidance clinics, in employment offices, and as research workers on problems relating to cultural relations with other countries, to propaganda, and to education.

A large number of these positions require that the applicant have at least one year of graduate work and not a few require that he or she have a Ph.D. degree. For many others, however, college graduates with a major in psychology begin an internship with the firm or agency which employs them and then continue after this internship in a regular full-time position.

*Social Service*—Students who major in sociology lay the undergraduate foundation for numerous phases of work with either private or public agencies in the social service field, such as social case work, family welfare, child welfare, probation and parole, juvenile court, and settlement work, and relief administration. At least one year of graduate study in a school of social work is essential for those who desire full professional status.

*Statistical Work*—The growing emphasis upon statistics in business, education, social service, and government has opened a new career field for

the student who majors in mathematics and obtains preparation in statistics. Similar training is necessary for students who wish to enter the actuarial field.

*Teaching (Secondary School)*—While a major in education is not offered in the College of Liberal Arts, a minor in this field is available which meets the recommended preparation of the Department of Education of the Commonwealth of Massachusetts for teachers in secondary schools. Students from other states should familiarize themselves with the requirements of their own state as these requirements are constantly being increased.

Most small secondary schools, in which the graduate must begin, expect teachers to be able to teach at least two, and often three, subjects. Consequently programs should provide for the common combinations of related subjects. A major should be selected from the following fields: biology, chemistry, English, history-government, modern languages, or mathematics-physics.

Students who desire to become teacher-coaches may minor in physical education, provided they elect the required courses in education.

*Teaching (College)*—Students who plan to enter the college teaching profession will find that each of the major programs affords an excellent preparation for graduate study in the leading universities of the country. Since graduate schools usually require a reading knowledge of French or German, frequently both, students should elect adequate work in these languages. Seminar courses and thesis work are strongly recommended for their training in research techniques.

# Admission Requirements

Applicants for admission to the freshman class must qualify by *one* of the following methods:

1. Graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed below.

2. Completion of fifteen acceptable secondary school units with a degree of proficiency satisfactory to the Department of Admissions.

3. Examinations.

Applicants whose secondary school records are satisfactory are not required to take entrance examinations in high school subjects, but all candidates for the freshman class are asked to come to Northeastern University to take scholastic aptitude tests.

## *Prescribed Subjects for Admission*

### *College of Liberal Arts*

Fifteen units are required for admission and must include three units (four years) in English and at least six units in foreign languages, mathematics, science, or social studies except that students planning to major in mathematics or science must present two units in algebra and one unit in plane geometry. The remaining units are elective from other secondary school subjects which are acceptable to the Committee on Admissions.

A unit is a credit given to an acceptable secondary school course which meets at least four times a week for periods of not less than forty minutes each throughout the school year.

The Department of Admissions reserves the right to require a candidate to be present for an examination in any subjects that it may deem necessary because of some weakness in the secondary school record.

## *Other Requirements*

These formal requirements are necessary and desirable in that they tend to provide all entering students with a common ground upon which the first year of the college curriculum can be based. But academic credits alone are not an adequate indication of a student's ability to profit by a college education. Consequently, the Department of Admissions takes into consideration, along with the formal requirements, other factors regarding candidates for the freshman class. A student's interests and aptitudes in so far as they can be determined, capacity for hard work, attitude toward classmates and teachers in high school, physical stamina, and most important of all, character, are considered. In this way the University seeks to select for its student body those who not only meet the academic admission requirements but who also give promise of acquitting themselves creditably in the rigorous program of training afforded by the Co-operative Plan and of being useful members of society.

## *Personal Interview*

A personal interview is always preferred to correspondence, and parents are urged to accompany the applicant whenever this is possible. Effective guidance depends in large measure upon a complete knowledge of a student's background and problems. Parents invariably are able to contribute information that aids the admissions officer in arriving at a decision.

Candidates should visit the Office of Admissions for personal interview if it is possible for them to do so before submitting their applications. Office hours are from 9:00 A.M. to 4:00 P.M. daily; Saturdays to 12:00 M. The Department of Admissions will interview applicants on Wednesday evenings but by appointment only.

## *Application for Admission*

Each applicant for admission is required to fill out an application blank stating previous education, as well as the names of persons to whom reference may be made.

A fee of five dollars ($5.00) is required when the application is filed. This fee is nonreturnable.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five-dollar fee to Director of Admissions, Northeastern University, Boston 15, Massachusetts. Checks should be made out to Northeastern University.

Upon receipt of the application, properly filled out, the University secures the references and secondary school record. As soon as possible after the Committee on Admissions has reviewed the completed application, a report of the status with respect to admission will be sent to each candidate.

Early filing of applications is recommended.

The University reserves the right to place any entering student upon an indefinite trial period. Reclassification would be determined upon the academic success of the student.

## *Registration*

Eligibility for admission does not constitute registration. Freshmen will register at the University on Thursday, September 4, 1947, and Thursday, November 13, 1947. Students are not considered to have met the requirements for admission until they have successfully passed the required physical examination.

## *Advanced Standing*

Students transferring from approved colleges will be admitted to advanced standing provided their records warrant it. Whenever a person enters with advanced standing and later proves to have had inadequate preparation in any prerequisite subjects, the faculty reserves the right to require the student to make up such deficiencies.

Applicants seeking advanced standing should arrange to have transcripts of their previous college records forwarded with their initial

inquiry. Students admitted to advanced standing are not eligible for placement at co-operative work until they have completed a full year of academic work at the University.

### *Outline of Freshman Courses*

The first year is a period of full-time study during which the student must demonstrate fitness for the program which has been elected. Students who are unsuccessful in the basic courses of the freshman year will not be permitted to continue with their advanced program, but will be advised to change their goal and type of training. In some instances this will mean change to another curriculum at Northeastern; in others, withdrawal from the institution. *The freshman courses are so arranged as to permit change of objective during or at the end of the first year with a minimum loss of time.*

## *Requirements for Graduation*

### *Degrees*

The College of Liberal Arts awards the Bachelor of Arts degree to qualified candidates who have majored in economics, English, history and government, modern languages, psychology, or sociology.

The Bachelor of Science degree is awarded to qualified candidates who have majored in biology, chemistry, mathematics and physics, or have taken the premedical curriculum.

### *Quantity Requirements*

Candidates for either degree must have completed a minimum of 208 credit hours of work including 48 credit hours of work in a major field and 24 credit hours of work in a related minor field. Students who undertake co-operative work assignments must meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

### *Quality Requirement*

Of the 208 credit hours required for a degree at least 135 credit hours must have been completed with a grade of C or better.

### *Specific Course Requirements*

In addition to the prescribed courses in the candidate's major field as listed on pages 73 to 84, all students must have completed in required and elective courses a minimum of:

1. Fifteen credit hours in English.
2. Eighteen credit hours in modern language*. The elementary course in a language will not be accepted in fulfillment of this requirement unless followed by a second year in the same language.
3. Ten credit hours in a natural science.
4. Eighteen credit hours in the social sciences.

### *Graduation with Honor*

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

## *Graduate Study*

Graduate work in biology, chemistry and physics is offered to properly qualified students desiring to undertake advanced study leading to the degree of Master of Science. Candidates for admission to this program must be high ranking students who have completed, or will have completed prior to admission to the graduate program, the requirements for the Bachelor of Science degree with major in biology, chemistry, or physics at an institution of recognized standing. At the present time the program is limited to teaching fellows at Northeastern University.

### *Requirements for the Master of Science Degree*

Candidates for the degree of Master of Science in biology, chemistry, or physics must have completed satisfactorily 48 credit hours of study beyond that required for the Bachelor's degree. Of these, 32 credit hours (including thesis) must be graduate courses in the major field of biology, chemistry, or physics; the remaining 16 credits may be earned in a minor field.

The graduate courses are listed under the departments giving graduate work. The minor credits may be selected from graduate courses or from certain advanced undergraduate courses called "B" courses. (Graduate students must obtain a grade of B or better to receive credit for "B" courses.)

Candidates are also required to complete a satisfactory thesis as a partial requirement for the Master's degree. Theses must be completed in the field of major study and will be credited toward the major requirement. Theses must be completed at least four weeks in advance of the date on which the degree is to be awarded.

Finally, candidates are required to pass satisfactorily a comprehensive examination which may be written or oral at the discretion of the department concerned.

*This requirement may be satisfied by the passing of a language proficiency examination upon petition to the faculty.

Individual programs of study must have the approval of the Director of Graduate Study who also acts as registration officer for graduate students.

## Curricular Requirements

The following fields of study are approved as major fields in the College of Liberal Arts: biology, chemistry, economics, English, English-Journalism, history and government, modern languages, mathematics and physics, psychology, and sociology. In addition, two-year programs are approved for predental and prelegal students.

Students may elect their minor fields after consultation with their faculty advisers. In addition to the major fields listed above, the following subjects are available as minors: education, French, German, philosophy, physical education, and Spanish.

The required courses in each curriculum are indicated on the following pages. Upon petition to the faculty, substitutions may be permitted in exceptional cases when required by the specific vocational objective of the student.

During the last year students in all curricula are required to attend a series of meetings designed to prepare them for placement in specific positions in their chosen vocational field. Under expert guidance each student prepares a complete personnel record, studies himself or herself and the opportunities that are open, and works out a complete campaign for obtaining after-graduation employment.

## *Curriculum in Biology (10)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 8 | 30 | 17 | | | 15 | 8 | 30 | 17 | | | 14 | 8 | 28 | 16 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 10-55 | Vert. Zool. | 2 | 6 | 4 | 4 | 10-56 | Vert. Zool. | 2 | 6 | 4 | 4 |
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psych. | 4 | 0 | 8 | 4 |
| 15-11 | Gen. Phys. | 6 | 0 | 12 | 3 | 15-12 | Gen. Phys. | 3 | 3 | 9 | 5 | 15-13 | Gen. Phys. | 3 | 3 | 9 | 5 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 15 | 6 | 30 | 8½ | | | 13 | 9 | 29 | 17 | | | 13 | 9 | 29 | 17 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-57 | Inv. Zool. | 2 | 6 | 4 | 4 | 10-58 | Inv. Zool. | 2 | 6 | 4 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 10-40 | Anim. Phys. | 4 | 0 | 8 | 4 | 10-41 | Anim. Phys. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 14 | 6 | 28 | 16 | | | 14 | 6 | 28 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-59 | An. Histol. | 2 | 6 | 4 | 4 | 10-60 | An. Histol. | 2 | 6 | 4 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 10-61 | Vert. Embry. | 2 | 6 | 4 | 4 | 10-62 | Vert. Embry. | 2 | 6 | 4 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 12 | 12 | 24 | 16 | | | 12 | 12 | 24 | 16 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-63 | Gen. Para. | 2 | 6 | 4 | 4 | 10-64 | Gen. Para. | 2 | 6 | 4 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 10-65 | or Genetics | 4 | 0 | 8 | 4 | 10-66 | or Genetics | 4 | 0 | 8 | 4 |
| | | | | | | 10-20 | Gen. Bact. or | 2 | 6 | 4 | 4 | 10-21 | Gen. Bact. or | 2 | 6 | 4 | 4 |
| | | | | | | 10-67 | Mam. Anat. | 1 | 8 | 3 | 4 | 10-68 | Mam. Anat. | 1 | 8 | 3 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 12 | 12 | 24 | 16 | | | 12 | 12 | 24 | 16 |
| | | | | | | | *or* | 13 | 8 | 27 | | | *or* | 13 | 8 | 27 | |

*Summer term — 5 weeks.

# *Curriculum in Chemistry (11)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-01 | Coll. Alg. | 5 | 0 | 7 | 4 | 14-02 | Trig. | 5 | 0 | 7 | 4 | 14-03 | Anal. Geom. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 18 | 5 | 33 | 18 | | | 18 | 5 | 33 | 18 | | | 17 | 5 | 34 | 18 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 11-11 | Qual. Anal. | 3 | 10 | 5 | 6 | 11-12 | Quant. Anal. | 4 | 6 | 8 | 6 |
| 14-04 | Int. to Calc. | 5 | 0 | 10 | 2½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 3 | 28 | 7½ | | | 14 | 13 | 27 | 18 | | | 15 | 9 | 30 | 18 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 11-13 | Quant. Anal. | 3 | 9 | 6 | 6 | 11-30 | Phys. Chem. | 4 | 3 | 8 | 5 |
| | Elective | 8 | 0 | 16 | 4 | 11-41 | Chem. Lit. | 1 | 0 | 2 | 1 | 11-15 | Inst. Anal. | 2 | 6 | 4 | 4 |
| | | | | | | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| | | | | | | 20-11 | Economics | 3 | 0 | 6 | 3 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 14 | 9 | 28 | 17 | | | 13 | 9 | 26 | 16 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 11-20 | Org. Chem. | 3 | 6 | 6 | 5 | 11-21 | Org. Chem. | 3 | 6 | 6 | 5 |
| | Elective | 8 | 0 | 16 | 4 | 11-31 | Phys. Chem. | 4 | 4 | 7 | 5 | 11-32 | Phys. Chem. | 4 | 4 | 7 | 5 |
| | | | | | | 15-14 | Adv. Phys. | 2 | 2 | 5 | 3 | 15-15 | Adv. Phys. | 2 | 2 | 5 | 3 |
| | | | | | | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-02 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 13 | 12 | 26 | 17 | | | 13 | 12 | 26 | 17 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 11-09 | Ad. Inorg. | | | | | 11-24 | Org. Chem. | 3 | 6 | 6 | 5 |
| | Elective | 8 | 0 | 16 | 4 | | Chem. | 3 | 0 | 6 | 3 | 11-40 | Coll. Ch. | 3 | 3 | 6 | 4 |
| | | | | | | 11-22 | Org. Chem. | 3 | 0 | 6 | 3 | 30-07 | Eff. Spkg. | 3 | 0 | 6 | 3 |
| | | | | | | 11-23 | Org. Anal. | | | | | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Lab. | 0 | 9 | 0 | 3 | | | | | | |
| | | | | | | 30-09 | Rept. Writ. | 3 | 0 | 6 | 3 | | | | | | |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 13 | 9 | 26 | 16 | | | 13 | 9 | 26 | 16 |

*Summer term — 5 weeks.

## *Curriculum in Mathematics-Physics (12)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-01 | Coll. Alg. | 5 | 0 | 7 | 4 | 14-02 | Trig. | 5 | 0 | 7 | 4 | 14-03 | Anal. Geom. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Train. | 0 | 2 | 0 | | 16-11 | Phys. Train. | 0 | 2 | 0 | | 16-12 | Phys. Train. | 0 | 2 | 0 | |
| | | 18 | 5 | 33 | 18 | | | 18 | 5 | 33 | 18 | | | 17 | 5 | 34 | 18 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 30-33 | Engl. Lit. | 4 | 0 | 8 | 4 | 30-34 | Engl. Lit. | 4 | 0 | 8 | 4 |
| 14-04 | Int. to Calc. | 5 | 0 | 10 | 2½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 3 | 28 | 7½ | | | 15 | 3 | 30 | 16 | | | 15 | 3 | 30 | 16 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 14-18 | Theo. Eq. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 15-20 | Optics | 3 | 2 | 7 | 4 | 15-21 | Optics | 3 | 2 | 7 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 14 | 2 | 29 | 15 | | | 15 | 2 | 31 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 14-15 | Adv. Calc. | 4 | 0 | 8 | 4 | 14-16 | Adv. Calc. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 15-24 | Electronics | 3 | 2 | 7 | 4 | 15-25 | Electronics | 3 | 2 | 7 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 15 | 2 | 31 | 16 | | | 15 | 2 | 31 | 16 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 14-17 | Inf. Series | 4 | 0 | 8 | 4 | 14-20 | Spec. Topics in Math. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 15-26 | Mod. Phys. | 3 | 2 | 7 | 4 | 15-27 | Mod. Phys. | 3 | 2 | 7 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 15 | 2 | 31 | 16 | | | 15 | 2 | 31 | 16 |

*Summer term — 5 weeks.

# *Premedical Curriculum (14)*

## FIRST YEAR

| Term 1 | | | | | | Term 2 | | | | | | Term 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 8 | 30 | 17 | | | 15 | 8 | 30 | 17 | | | 14 | 8 | 28 | 16 |

## SECOND YEAR

| Term 4* | | | | | | Term 5 | | | | | | Term 6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 10-55 | Vert. Zool. | 2 | 6 | 4 | 4 | 10-56 | Vert. Zool. | 2 | 6 | 4 | 4 |
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psy. | 4 | 0 | 8 | 4 |
| 15-11 | Gen. Phys. | 6 | 0 | 12 | 3 | 15-12 | Gen. Phys. | 3 | 3 | 9 | 5 | 15-13 | Gen. Phys. | 3 | 3 | 9 | 5 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 1½ | | Mod. Lang. Elective | 4 | 0 | 8 | 4 | | Mod. Lang. Elective | 4 | 0 | 8 | 4 |
| | | 15 | 6 | 30 | 8½ | | | 13 | 9 | 29 | 17 | | | 13 | 9 | 29 | 17 |

## THIRD YEAR

| Term 7* | | | | | | Term 8 | | | | | | Term 9 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-57 | Inv. Zool. | 2 | 6 | 4 | 4 | 10-58 | Inv. Zool. | 2 | 6 | 4 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 11-11 | Qual. Anal. | 3 | 10 | 5 | 6 | 11-12 | Quant. Anal. | 4 | 6 | 8 | 6 |
| | | | | | | 20-11 | Economics | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 12 | 16 | 23 | 17 | | | 13 | 12 | 26 | 17 |

## FOURTH YEAR

| Term 10* | | | | | | Term 11 | | | | | | Term 12 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-40 | Anim. Phys. | 4 | 0 | 8 | 4 | 10-41 | Anim. Phys. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 11-26 | Org. Chem. | 5 | 6 | 10 | 7 | 12-27 | Org. Chem. | 5 | 6 | 10 | 7 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 13 | 6 | 26 | 15 | | | 13 | 6 | 26 | 15 |

## FIFTH YEAR

| Term 13* | | | | | | Term 14 | | | | | | Term 15 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 10-63 | Gen. Parasit. | 2 | 6 | 4 | 4 | 10-64 | Gen. Parasit. | 2 | 6 | 4 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 10-65 | or Genetics | 4 | 0 | 8 | 4 | 10-66 | or Genetics | 4 | 0 | 8 | 4 |
| | | | | | | 10-67 | Mam. Anat. | 1 | 8 | 3 | 4 | 10-68 | Mam. Anat. | 1 | 8 | 3 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 15 | 14 | 23 | 16 | | | 15 | 14 | 23 | 16 |
| | | | | | | | *or* | 15 | 8 | 27 | | | *or* | 15 | 8 | 27 | |

*Summer term — 5 weeks.

# *Curriculum in Economics (20)*

## FIRST YEAR

| Term 1 | | | | | | Term 2 | | | | | | Term 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English I | 3 | 0 | 6 | 3 | 30-02 | English I | 3 | 0 | 6 | 3 | 30-03 | English I | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

## SECOND YEAR

| Term 4* | | | | | | Term 5 | | | | | | Term 6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. or | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psych. | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

## THIRD YEAR

| Term 7* | | | | | | Term 8 | | | | | | Term 9 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 20-16 | Acct. Prin. | 3 | 2 | 7 | 4 | 20-17 | Acct. Prin. | 3 | 2 | 7 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 15 | 2 | 31 | 16 | | | 15 | 2 | 31 | 16 |

## FOURTH YEAR

| Term 10* | | | | | | Term 11 | | | | | | Term 12 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 20-18 | Am. Ec. Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 15 | 2 | 31 | 16 | | | 15 | 2 | 31 | 16 |

## FIFTH YEAR

| Term 13* | | | | | | Term 14 | | | | | | Term 15 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 20-24 | Mon. & Bk. | 4 | 0 | 8 | 4 | 20-25 | Bus. Cycles | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 20-31 | Ad. Ec. Theo. | 4 | 0 | 8 | 4 | 20-32 | Ad. Ec. Theo. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

## *Curriculum in English and English-Journalism (21)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English I | 3 | 0 | 6 | 3 | 30-02 | English I | 3 | 0 | 6 | 3 | 30-03 | English I | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | or Gen. Bot. | 3 | 3 | 6 | 2 | 23-17 | U.S. to 1865 | 4 | 0 | 8 | 4 | 23-18 | U.S.since1865 | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 30-33 | Engl. Lit. | 4 | 0 | 8 | 4 | 30-34 | Engl. Lit. | 4 | 0 | 8 | 4 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 30-21 | Adv. Comp. | 4 | 0 | 8 | 4 | 30-22 | Adv. Comp. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 30-29 | Found. Engl. | | | | | 30-30 | Found. Engl. | | | | |
| | Elective | 8 | 0 | 16 | 4 | | Lang. or | 4 | 0 | 8 | 4 | | Lang. or | 4 | 0 | 8 | 4 |
| | | | | | | 30-51 | Int. Jour. | 4 | 0 | 8 | 4 | 30-52 | Int. Jour. | 4 | 0 | 8 | 4 |
| | | | | | | 30-35 | Am. Lit. | 4 | 0 | 8 | 4 | 30-36 | Am. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 30-43 | 19th Ct. Pr. | 4 | 0 | 8 | 4 | 30-44 | 19th Ct. Pr. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 30-53 | or Tech. of | | | | | 30-54 | or Tech. of | | | | |
| | | | | | | | Jour. | 4 | 0 | 8 | 4 | | Jour. | 4 | 0 | 8 | 4 |
| | | | | | | 30-61 | Shakespeare | 4 | 0 | 8 | 4 | 30-62 | Shakespeare | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

## *Curriculum in History-Government (22)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English 1 | 3 | 0 | 6 | 3 | 30-02 | English 1 | 3 | 0 | 6 | 3 | 30-03 | English 1 | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. or | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 23-17 | U.S. Hist. | 4 | 0 | 8 | 4 | 23-18 | U.S. Hist. | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 30-33 | Engl. Lit. | 4 | 0 | 8 | 4 | 30-34 | Engl. Lit. | 4 | 0 | 8 | 4 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 1½ | | Mod. Lang. Elective | 4 | 0 | 8 | 4 | | Mod. Lang. Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 22-11 | Comp. Gov. | 4 | 0 | 8 | 4 | 22-12 | Comp. Gov. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 23-11 | Eur. Hist. | 4 | 0 | 8 | 4 | 23-12 | Eur. Hist. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 22-13 | Pol. Theory | 4 | 0 | 8 | 4 | 22-14 | Pol. Theory | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 23-13 | Engl. Hist. | 4 | 0 | 8 | 4 | 23-14 | Engl. Hist. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 22-20 | Pub. Adm. | 4 | 0 | 8 | 4 | 22-21 | Pub. Adm. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 23-19 | Lt. Am. His. | 4 | 0 | 8 | 4 | 23-10 | Lt. Am. His. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

## *Curriculum in Modern Languages (23)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English I | 3 | 0 | 6 | 3 | 30-02 | English I | 3 | 0 | 6 | 3 | 30-03 | English I | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. or | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 23-17 | U.S. Hist. | 4 | 0 | 8 | 4 | 23-18 | U.S. Hist. | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 30-33 | Engl. Lit. | 4 | 0 | 8 | 4 | 30-34 | Engl. Lit. | 4 | 0 | 8 | 4 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 1½ | | Mod. Lang. Elective | 4 | 0 | 8 | 4 | | Mod. Lang. Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

### THIRD YEAR

| Term 7* | | | | | Term 8† | | | | | Term 9† | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 31-21 | Mod. Fr. Lit. | 4 | 0 | 8 | 4 | 31-22 | Mod. Fr. Lit. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 32-21 | Mod. Ger. Lit. | 4 | 0 | 8 | 4 | 32-22 | Mod. Ger. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | 33-21 | Span. Lit. | 4 | 0 | 8 | 4 | 33-22 | Span. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11† | | | | | Term 12† | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 31-23 | Fr. Class'm. | 4 | 0 | 8 | 4 | 31-24 | Fr. Class'm. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 32-23 | Cl. Ger. Lit. | 4 | 0 | 8 | 4 | 32-24 | Cl. Ger. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | 33-23 | Mod. Sp. Lt. | 4 | 0 | 8 | 4 | | | | | | |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | 33-24 | Mod. Span. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | | | | | | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 31,32, | Ad. Cmp. | | | | | 31,32, | Ad. Cmp. | | | | |
| | Elective | 8 | 0 | 16 | 4 | 33-31 | & Conv. | 4 | 0 | 8 | 4 | 33-32 | & Conv. | 4 | 0 | 8 | 4 |
| | | | | | | 31-25 | Fr. Rom. or | 4 | 0 | 8 | 4 | 31-26 | Fr. Rom. or | 4 | 0 | 8 | 4 |
| | | | | | | 32-25 | 19th Cent. Ger. Lit. | 4 | 0 | 8 | 4 | 32-26 | 19th Cent. Ger. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | 33-25 | or Span. Am. Lit. | 4 | 0 | 8 | 4 | 33-26 | or Span. Am. Lit. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

†Two language courses to be taken depending upon field of concentration.

## *Curriculum in Psychology (25)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 8 | 30 | 17 | | | 15 | 8 | 30 | 17 | | | 14 | 8 | 28 | 16 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 10-55 | Vert. Zool. | 2 | 6 | 4 | 4 | 10-56 | Vert. Zool. | 2 | 6 | 4 | 4 |
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 15-12 | Gen. Phys. | 3 | 3 | 9 | 5 | 15-13 | Gen. Phys. | 3 | 3 | 9 | 5 |
| 15-11 | Gen. Phys. | 6 | 0 | 12 | 3 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psych. | 4 | 0 | 8 | 4 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 15 | 6 | 30 | 8½ | | | 13 | 9 | 29 | 17 | | | 13 | 9 | 29 | 17 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 16 | 0 | 4 | 25-11 | Ind. Diff. | 4 | 0 | 8 | 4 | 25-17 | Measure. I | 4 | 0 | 8 | 4 |
| | Elective | 8 | 16 | 0 | 4 | 25-12 | Exp. Psych. | 3 | 3 | 6 | 4 | 25-13 | Exp. Psych. | 3 | 3 | 6 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 32 | 0 | 8 | | | 15 | 3 | 30 | 16 | | | 15 | 3 | 30 | 16 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 16 | 0 | 4 | 25-18 | Measure. II | 4 | 0 | 8 | 4 | 25-14 | Exp. Psych. | 3 | 3 | 6 | 4 |
| | Elective | 8 | 16 | 0 | 4 | 25-29 | Psych. Pers. | 4 | 0 | 8 | 4 | 25-31 | Ab. Psych. | 4 | 0 | 8 | 4 |
| | | | | | | 25-71 | Seminar | 2 | 0 | 1 | 1 | 25-71 | Seminar | 2 | 0 | 1 | 1 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 32 | 0 | 8 | | | 18 | 0 | 33 | 17 | | | 17 | 3 | 31 | 17 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 16 | 0 | 4 | 25-32 | Ab. Psych. | 4 | 0 | 8 | 4 | 25-34 | Child Psy. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 16 | 0 | 4 | 25-36 | Ind. Psych. or | 4 | 0 | 8 | 4 | 25-37 | Ind. Psy. or | 4 | 0 | 8 | 4 |
| | | | | | | 25-41 | Adv. Psych. | 4 | 0 | 8 | 4 | 25-42 | Adv. Psy. | 4 | 0 | 8 | 4 |
| | | | | | | 25-73 | Seminar | 2 | 0 | 1 | 1 | 25-74 | Seminar | 2 | 0 | 1 | 1 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 32 | 0 | 8 | | | 18 | 0 | 33 | 17 | | | 18 | 0 | 33 | 17 |

*Summer term — 5 weeks.

*Summer term — 5 weeks.

# *Curriculum in Sociology (26)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English I | 3 | 0 | 6 | 3 | 30-02 | English I | 3 | 0 | 6 | 3 | 30-03 | English I | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. or | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psych. | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-02 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 1½ | | Mod. Lang. Elective | 4 | 0 | 8 | 4 | | Mod. Lang. Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 26-11 | Soc. Prob. | 4 | 0 | 8 | 4 | 26-12 | Soc. Prob. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 26-13 | Soc. Eth. | 4 | 0 | 8 | 4 | 26-14 | Soc. Eth. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 26-15 | The Family | 4 | 0 | 8 | 4 | 26-16 | Criminology | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Elective | 8 | 0 | 16 | 4 | 26-17 | Urban Soc. | 4 | 0 | 8 | 4 | 26-18 | Soc. Prog. | 4 | 0 | 8 | 4 |
| | Elective | 8 | 0 | 16 | 4 | 26-19 | Soc. Theory | 4 | 0 | 8 | 4 | 26-22 | Prin. Soc. Wk | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

## *Two-Year Predental Curriculum (13)*

FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 11-01 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-02 | Gen. Chem. | 3 | 3 | 6 | 4 | 11-03 | Gen. Chem. | 3 | 3 | 6 | 4 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 8 | 30 | 17 | | | 15 | 8 | 30 | 17 | | | 14 | 8 | 28 | 16 |

SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 10-55 | Vert. Zool. | 2 | 6 | 4 | 4 | 10-56 | Vert. Zool. | 2 | 6 | 4 | 4 |
| 11-04 | Gen. Chem. | 3 | 3 | 6 | 2 | 25-01 | Int. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen. Psych. | 4 | 0 | 8 | 4 |
| 15-11 | Gen. Phys. | 6 | 0 | 12 | 3 | 15-12 | Gen. Phys. | 3 | 3 | 9 | 5 | 15-13 | Gen. Phys. | 3 | 3 | 9 | 5 |
| | Mod. Lang. | | | | | | Mod. Lang. | | | | | | Mod. Lang. | | | | |
| | Elective | 3 | 0 | 6 | 1½ | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 15 | 6 | 30 | 8½ | | | 13 | 9 | 29 | 17 | | | 13 | 9 | 29 | 17 |

| Term 5-A | | | | |
|---|---|---|---|---|
| 10-40 | Anim. Phys. | 4 | 0 | 8 | 4 |
| 11-26 | Org. Chem. | 5 | 6 | 10 | 7 |
| | Lib. Elect. | 4 | 0 | 8 | 4 |
| | | 13 | 6 | 26 | 15 |

*Summer term — 5 weeks.

# *Two-Year Prelegal Curriculum (24)*

## FIRST YEAR

| Term 1 | | | | | | Term 2 | | | | | | Term 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English I | 3 | 0 | 6 | 3 | 30-02 | English I | 3 | 0 | 6 | 3 | 30-03 | English I | 3 | 0 | 6 | 3 |
| 23-01 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civ. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civ. | 4 | 0 | 8 | 4 |
| 22-01 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-02 | Am. Gov. or | 3 | 0 | 6 | 3 | 22-03 | Am. Gov. or | 3 | 0 | 6 | 3 |
| 14-21 | Basic Math. | 3 | 0 | 6 | 3 | 14-22 | Basic Math. | 3 | 0 | 6 | 3 | 14-23 | Basic Math. | 3 | 0 | 6 | 3 |
| 15-07 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-08 | Surv. Sci. or | 3 | 0 | 6 | 3 | 15-09 | Surv. Sci. or | 3 | 0 | 6 | 3 |
| 10-01 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-02 | Gen. Zool. | 2 | 3 | 4 | 3 | 10-03 | Gen. Bot. | 2 | 3 | 4 | 3 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 | | Mod. Lang. Elective | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 | | | 15 | 2 | 30 | 16 |
| | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | | | *or* | 16 | 5 | 32 | |

## SECOND YEAR

| Term 4* | | | | | | Term 5 | | | | | | Term 6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-10 | Surv. Sci. or | 4 | 0 | 8 | 2 | 20-05 | Econ. Geog. | 4 | 0 | 8 | 4 | 20-13 | Econ. Prin. | 4 | 0 | 8 | 4 |
| 10-04 | Gen. Bot. | 3 | 3 | 6 | 2 | 23-17 | U.S. Hist. | 4 | 0 | 8 | 4 | 23-18 | U.S. Hist. | 4 | 0 | 8 | 4 |
| 23-04 | Hist. Civ. | 4 | 0 | 8 | 2 | 30-33 | Engl. Lit. | 4 | 0 | 8 | 4 | 30-34 | Engl. Lit. | 4 | 0 | 8 | 4 |
| | Mod. Lang. Elective | 3 | 0 | 6 | 1½ | | Mod. Lang. Elective | 4 | 0 | 8 | 4 | | Mod. Lang. Elective | 4 | 0 | 8 | 4 |
| 30-04 | English | 5 | 0 | 10 | 2½ | | | | | | | | | | | | |
| | | 16 | 0 | 32 | 8 | | | 16 | 0 | 32 | 16 | | | 16 | 0 | 32 | 16 |
| | *or* | 15 | 3 | 30 | | | | | | | | | | | | | |

| Term 5-A | | | | | |
|---|---|---|---|---|---|
| 22-11 | Comp. Gov. | 4 | 0 | 8 | 4 |
| 23-13 | Engl. Hist. | 4 | 0 | 8 | 4 |
| | Elective | 4 | 0 | 8 | 4 |
| | Elective | 4 | 0 | 8 | 4 |
| | | 16 | 0 | 32 | 16 |

*Summer term — 5 weeks.

# Synopses of Courses of Instruction

On the pages which follow are given the synopses of courses offered in the several curricula of the College of Liberal Arts. Curricula in each of the three colleges on either the co-operative or full-time plan comprise 130 weeks of classroom instruction, namely, three ten-week periods in the freshman year and 100 weeks of upperclass work. On the Co-operative Plan, the upperclass courses are evenly distributed over four years so that each division of co-operative students has 25 weeks of college work, 26 weeks of co-operative work, and one week of vacation annually.

A complete list of the courses of instruction offered in each of the Day Colleges is included in a special section of the catalog beginning on page 207. This section lists the prerequisite and preparation requirements, class and laboratory hours per week, the number of hours normally required for study preparation hours, and the number of credits which have been assigned to each course.

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

## *Biology*

*(Courses designated with (g) may be taken for graduate credit)*

### *Botany*

*10-03 General Botany*—An introductory course with emphasis upon the structure, function, classification, life histories, heredity and distribution of the chief groups of plants.

*10-04 General Botany*—A continuation of 10-03.

*10-07 Morphology of Thallophytes (g)*—The structure, life histories, and taxonomy of the algae and fungi.

*10-08 Morphology of Bryophytes and Pteridophytes (g)*—The structure, life histories, and taxonomy of the liverworts, mosses, ferns and their allies.

*10-09 Morphology of Spermatophytes (g)*—The structure, life histories, and taxonomy of the gymnosperms and angiosperms.

### *Bacteriology*

*10-20 General Bacteriology*—A study of the fundamental principles of bacteriology and their applications. The preparation of culture media, methods of sterilization, differential staining, isolation and handling of pure cultures, taxonomy of pathogenic and nonpathogenic bacteria, their structure and physiology.

*10-21 General Bacteriology*—Continues 10-20.

*10-22 Advanced Bacteriology* (g)—This course is designed to give more detailed information and training in the newer aspects of bacteriology and immunity.

*10-23 Advanced Bacteriology* (g)—A continuation of 10-22.

## *Physiology*

*10-40 Animal Physiology*—The principles of physiology and their application to life processes in animals. The lectures deal with the physiology of muscle, nerve, organs of special sense, circulation and respiration. Demonstrations and recitations.

*10-41 Animal Physiology*—A continuation of 10-40. In this part of the course the lectures deal with digestion, metabolism, secretion, excretion and reproduction. Demonstrations and recitations.

*10-42 Advanced Physiology* (g)—An advanced course of lectures. The subject matter will vary from year to year.

*10-43 Advanced Physiology* (g)—A continuation of 10-42.

## *Nutrition*

*10-44 Nutrition*—The principles of human nutrition including digestion and metabolism of the foodstuffs, food requirements of the body (calories, proteins, minerals, and vitamins).

*10-45 Nutrition*—A continuation of 10-44. Essentials of an adequate diet; calculation of prescribed diets; weight control; food habits; composition of foods.

*10-46 Advanced Nutrition* (g)—Nutritional needs of family groups; family food budgets; child and infant nutrition.

*10-47 Advanced Nutrition* (g)—A continuation of 10-46. Diet in diseases; dietetic treatment of impaired digestive or metabolic conditions.

## *Zoology*

*10-01 General Zoology*—An introductory course dealing with the basic principles of animal life. A survey of the main types of animals; their classification, structure, life histories, distribution and economic importance are considered. In this part of the course, the lectures deal with the following phyla: Protozoa, Porifera, Coelenterata, Ctenophora, Platyhelminthes, Nemathelminthes, Rotifera, and Bryozoa.

*10-02 General Zoology*—A continuation of 10-01. In this part of the course the lectures deal with the following phyla: Brachiopoda, Phoronidea, Chaetognatha, Annelida, Echinodermata, Mollusca, Arthropoda, and Chordata.

*10-55 Vertebrate Zoology*—This course deals with the comparative anatomy of the integuments, the skeletal, muscular, digestive and respiratory systems of the principal classes of vertebrates.

*10-56 Vertebrate Zoology*—A continuation of 10-55. In this part of the course, the lectures deal with the comparative anatomy of the vascular, excretory, reproductive and nervous systems together with the organs of special sense of the principal classes of vertebrates.

*10-57 Invertebrate Zoology*—This course deals with the comparative development and structure of the organic systems of invertebrate animals as represented by the following phyla: Protozoa, Porifera, Coelenterata, Ctenophora, Platyhelminthes, Nemathelminthes, Trochelminthes, and Molluscoidea; and their biological and ecological relationships.

*10-58 Invertebrate Zoology*—A continuation of 10-57. In this part of the course, the lectures deal with the comparative development and structure of the various organ systems of invertebrate animals as represented by the following phyla: Coelhelminthes, Mollusca, Arthropoda, and Echinodermata; and their biological and ecological relationships.

*10-59 Animal Histology*—The lectures deal with the normal microscopic anatomy of the cell, cell division, spermatogenesis, oögenesis, fertilization, histogenesis, and a systematic consideration of the histology of the fundamental tissues of the animal body.

*10-60 Animal Histology*—A continuation of 10-59. In this part of the course the lectures deal with the normal microscopic anatomy of the organ systems of the animal body.

*10-61 Vertebrate Embryology*—The lectures deal with the early and late stages of development of the Amphioxus, the Teleost, and the frog.

*10-62 Vertebrate Embryology*—A continuation of 10-61. In this part of the course the lectures deal with the early and late stages of development of the chick and pig.

*10-63 General Parasitology*—This course deals with the more important species of parasites and their relation to disease in man and the domestic animals. In this part of the course the parasitic protozoa and flat worms are considered.

*10-64 General Parasitology*—A continuation of 10-63. In this part of the course the parasitic round worms and arthropods are considered.

*10-65 Principles of Genetics*—This course deals with the laws of variation and inheritance; their application to man and to domestic animals and plants.

*10-66 Principles of Genetics*—A continuation of 10-65.

*10-67 Mammalian Anatomy* (*g*)—An advanced laboratory course in the dissection of a mammal. In this part of the course, the skeletal, muscular, digestive, and respiratory systems are considered.

*10-68 Mammalian Anatomy* (*g*)—A continuation of 10-67. In this part of the course, the urogenital, circulatory, and nervous systems are considered together with the organs of special sense.

*10-69 Histological Technique* (*g*)—This course is designed to present the fundamentals of histological technique. The lectures deal with the various methods of fixation, clearing, hardening, embedding, section cutting, and staining of vertebrate and invertebrate tissues.

*10-70 Histological Technique* (*g*)—A continuation of 10-69.

*10-71 History of Biology* (*g*)—A course treating the development of biological sciences from the earliest times to the present, and tracing the history of biological investigations.

*10-72 History of Biology* (*g*)—A continuation of 10-71.

*10-73 General Entomology* (*g*)—This course deals with the structure, classification, habits, life histories, and distribution of insects.

*10-74 Economic Entomology* (*g*)—Lectures, conferences, and laboratory work. This course deals with the life histories and habits of injurious insects and of means for their control.

*10-75 Seminar in Zoology*—Assigned readings and reports on selected topics. May be selected with the consent of the department by qualified seniors majoring in biology. Credit to be arranged.

*10-76 Seminar in Zoology*—A continuation of 10-75. Credit to be arranged.

## *Graduate Courses in Zoology*

*10-106 Parasitic Protozoa*—This course deals with the structure, phylogeny, taxonomy, of unicellular parasites of man and animals.

*10-107 Helminthology*—This course deals with the parasitic worms in man and animals.

*10-108 Sanitary Entomology*—This course deals with the disease-carrying insects and of means for their control. Entomological problems of municipal, industrial, household, and army camp sanitation. Particular emphasis is laid upon control of flies, mosquitoes, lice, fleas, and blood-sucking insects.

*10-109 Advanced Histology*—Lectures and intensive laboratory work.

*10-110 Advanced Histology*—A continuation of 10-109.

*10-111 Research in Zoology*—Open to a limited number of students who have given evidence of ability to do independent investigation. A reading knowledge of French and German is essential. Credit to be arranged.

*10-112 Research in Zoology*—A continuation of 10-111. Credit to be arranged.

*10-113 Thesis*—Credit to be arranged.

*10-114 Thesis*—A continuation of 10-113. Credit to be arranged.

*10-115 Reading and Conference*—Credit to be arranged.

*10-116 Reading and Conference*—Credit to be arranged.

## *Chemistry*

*11-01 General Chemistry*—The fundamental ideas of matter and energy; the properties of gases; liquids and solids; atomic and molecular weight; equations; properties of solutions; classification of elements.

*11-02 General Chemistry*—Atomic structure and radioactivity; electrons and valence; ionic reactions; acids and bases.

*11-03 General Chemistry*—Chemistry of nonmetals; chemistry of metals; electrochemistry; industrial inorganic chemistry.

*11-04 General Chemistry*—Elements of organic chemistry; industrial organic chemistry.

*11-09 Advanced Inorganic Chemistry*—Valence; atomic structure; nature of crystal bonds; properties of elements.

*11-11 Qualitative Analysis*—Mass action law; ionic equilibria; solubility product; hydrolysis; principles of semi-micro technique; laboratory work is devoted to semi-micro method for analysis of anions and cations.

*11-12 Quantitative Analysis*—Theory and practice of volumetric analysis; weighing; titration; ignition; combustion.

*11-13 Quantitative Analysis*—Theory and practice of gravimetric analysis; mineral procedures; common technical methods.

*11-15 Instrumental Analysis*—Analysis by use of instruments; microscope; spectrograph; photelometer; p H measurements; gas analysis.

*11-20 Organic Chemistry*—Reactions and properties of aliphatic compounds; class relationships; structural formulas; reaction mechanisms.

*11-21 Organic Chemistry*—Reactions and properties of aromatic compounds; importance and preparation of industrial aromatics.

*11-22 Organic Chemistry*—Reactions and properties of alicyclic and heterocyclic compounds; unit processes in organic chemistry; halogenation; oxidation; reduction; nitration; sulfonation; amination; and diazotization.

*11-23 Organic Analysis Laboratory*—Chemical and physical tests used in qualitative organic analysis; classification reactions; preparation of derivatives.

*11-24 Organic Chemistry*—Electronic interpretations of organic chemical reactions; discussions of current experimental literature from the viewpoint of the electronic theory; plastics; theory, preparation, and uses.

*11-26 Organic Chemistry*—Reaction and properties of aliphatic compounds; clan relationships; structural formulas; introduction to study of aromatic compounds.

*11-27 Organic Chemistry*—Reactions and properties of aromatic compounds; nitration; sulfonation; elementary study of heterocyclic compounds.

*11-28 Biological Chemistry*—Properties of carbohydrates, proteins, fats, enzymes, vitamins, drugs; tests for carbohydrates, fats, proteins.

*11-29 Biological Chemistry*—Chemistry of food and nutrition, digestion; chemical analysis of blood, lymph, milk, tissue, wine, foods, drugs, vitamins.

*11-30 Physical Chemistry*—Structure of matter: the three states of matter, solutions, colloidal dispersions, molecular and atomic structure.

*11-31 Physical Chemistry*—Thermodynamics: the first law, thermochemistry, the second law and entropy, free energy, equilibrium, the phase rule, chemical kinetics.

*11-32 Physical Chemistry*—Solutions of electrolytes: electrical conductance, electrolytic equilibrium, electromotive force, electrolysis and polarization.

*11-35 Thermodynamics*—First and second laws; deviation of real gases; entropy; thermochemistry; equilibrium; activity; third law.

*11-40 Colloid Chemistry*—Particle size; adoption; physical properties of colloids; preparation; emulsions; gels.

*11-41 Chemical Literature*—Types of chemical journals; library procedure; problems in obtaining information.

*11-42 History of Chemistry*—Development of scientific theories; contribution of scientific investigators.

*11-43 Thesis*—Experimental work under direction of staff members.

*11-44 Thesis*—Experimental work under direction of staff members.

## *Graduate Courses*

*11-100 Advanced Physical Chemistry*—Study of advanced topics in physical chemistry.

*11-101 Advanced Physical Chemistry*—Continuation of 11-100.

*11-102 Advanced Physical Chemistry*—Continuation of 11-101.

*11-103 Advanced Organic Chemistry*—Study of advanced topics of organic chemistry.

*11-104 Advanced Organic Chemistry*—Continuation of 11-103.

*11-105 Advanced Organic Chemistry*—Continuation of 11-104.

*11-106 Advanced Organic Chemistry*—Continuation of 11-105.

*11-107 Thesis*—Experimental problem. Hours per week not specified.

*11-108 Thesis*—Continuation of 11-107.

*11-109 Thesis*—Continuation of 11-108.

*11-110 Thesis*—Continuation of 11-109.

*11-111 Thesis*—Continuation of 11-110.

## *Economics*

*20-05 Economic Geography*—In order to provide an adequate background for the study of economics this course analyzes the economic resources of our country and the part played by these resources in the development of our modern industrial society. Emphasis is placed upon promot-

ing the comprehension of basic concepts rather than upon acquiring an encyclopedic knowledge of a mass of details.

*20-11 Economics*—After an analysis of the main characteristics of our modern economic order, attention is turned to the fundamental economic laws and principles governing the production of economic goods, the organization of business enterprise, money, banking, the business cycle, control of the price level, and international trade.

*20-12 Economics*—A continuation of 20-11. The first part of the course deals with the principles of price determination under competitive and monopolistic conditions, and the principles underlying the distribution of wealth and income into wages, interest, and profits. Consideration is then given to the major aspects of the economic problems of agriculture, public utility regulation, labor, consumption, public finance, and economic reform.

*20-13 Economic Principles*—A thorough grounding in the fundamental principles and laws of economics is the aim of this course. The main topics include the nature and organization of production, the nature and importance of wants, the relation of money and prices, the process of exchange, the nature of international trade, the determination of price under conditions of competition and monopoly, the distribution of wealth and income in the form of wages, economic rent, interest, and profits.

*20-14 Economic Problems*—In this course the application of economic principles to some of the major economic problems of modern society is emphasized. The problems studied include consumption, protective tariffs and subsidies, labor problems such as unemployment and labor unions, and the business cycle.

*20-15 Economic Problems*—A continuation of 20-14. Among the problems considered are the following: price stabilization, the agricultural problem, the relation of government to business, including control of monopolies and public utilities, insurance, public finance, and proposals for the remodeling and improving of the economic system.

*20-16 Principles of Accounting*—A survey of accounting principles with emphasis upon the nature, interpretation, and utilization of accounting data, and the preparation of financial statements.

*20-17 Principles of Accounting*—A continuation of 20-16 with attention to the problems of corporate accounting, the theories of cost and income and the interpretation of financial statements.

*20-18 American Economic History*—The economic development of the United States is traced from the colonial period to the present with special emphasis upon the period since the Civil War. Stress is laid upon

the importance of economic factors and changes in our history in the development of manufacturing, agriculture, domestic and foreign commerce, finance and banking, transportation, and labor organizations. Consideration is given to European developments which have been closely related to those of the United States.

*20-20 Statistics*—This course is intended to give the student an understanding of statistical principles and methods and their practical application in the social sciences. A study is made of the nature, sources, collection, and organization of statistical facts; the presentation of such facts in tabular or graphic form, the various averages, measures of dispersion, and the construction and use of index numbers.

*20-21 Statistics*—The major portion of this continuation of 20-20 concerns the analysis of time series, and includes the methods of obtaining trends, seasonal indexes, and the measurement of cyclical variation. The application of correlation analysis in the field of social science is given extended attention.

*20-24 Money and Banking*—This course considers the problems of monetary and banking control with particular emphasis upon the policies of the Federal Reserve System. Current developments are carefully considered.

*20-25 Business Cycles*—After a study of the conditions which underlie cyclical fluctuations in prices, volume of trade, physical production, and employment, a careful analysis is made of the more significant theories of the business cycle. The possibilities of controlling such fluctuations and of initiating recovery receive extended attention. Throughout the course emphasis is placed upon the current phase of the business cycle and its peculiar problems.

*20-26 Labor Economics*—After an intensive study of the application of economic principles to the labor markets and of the development of collective bargaining in the United States, the course will be devoted to an analysis of organization of unions, rights and responsibilities under the law, the bargaining process as reflected in the labor contract, and grievances and grievance procedures.

*20-27 International Economic Relations*—A careful examination of the important principles of international trade and finance precedes a critical survey of the international commercial policies of modern nations, with special reference to the United States. Such broader problems as the international control of raw materials, exchange restrictions, international cartels and the economic activities of the League of Nations and other international organizations are considered.

*20-28 Economic Systems*—After developing criteria for evaluating the different economic systems, the course proceeds to a comparative analysis

of capitalism, co-operation, socialism, communism, and fascism. The problems of economic planning receive particular attention.

*20-31 Advanced Economic Theory*—A critical review of the origin and development of economic thought. After a brief account of the contributions of Plato and Aristotle, the early Christian fathers, and the writers of the Middle Ages, each of the main schools of economic thought is taken up in turn: the Mercantilists, the Physiocrats, the Classical School, the Socialists, the Historical School, the Austrian School, and the Neo-Classical School.

*20-32 Advanced Economic Theory*—The course introduces the student to the more complex aspects of economic theory. Particular consideration is given to the major modern theoretical problems.

*20-61 Seminar*—Assigned readings and written reports on selected topics. May be elected with the consent of the department by qualified seniors majoring in economics.

*20-62 Seminar*—A continuation of 20-61.

The following courses offered in the College of Business Administration may be elected by majors in economics who have the necessary preparation:

43-01 Principles of Marketing
43-02 Principles of Advertising
44-01 Principles of Banking
44-02 Principles of Insurance
44-11 Business Finance
44-12 Business Finance
44-22 Investments
45-01 Industrial Management
45-02 Industrial Management
46-01 Business Law—Contracts

## *Education*

NOTE: In addition to the courses listed, 26-15 and 26-16 Educational Psychology may be counted as courses in Education.

*21-01 History of Education*—Education is considered as the means by which nations have attempted to realize their social and spiritual ideals. This course traces the history of education from ancient times through the Greek and Roman periods, the Middle Ages, the Renaissance and Reformation, down to John Locke and the Enlightenment. The course is concerned with the development of points of view as well as with the details of organization and practice.

*21-02 History of Education*—Beginning with the emotional reaction against formalism in life as exemplified by Rousseau, this course takes up

the immediate background of modern education and traces the development of national systems. The influence of such men as Pestalozzi, Herbart, Froebel, Spencer, Mann, Barnard, Dewey, and others is studied in detail. The course closes with a consideration of present tendencies in education.

*21-03 Educational Measurements*—The course concerns itself with current problems in the field of educational tests and measurements. Most of the lectures are given over to a discussion of the construction and use of new type objective tests, with particular reference to the field of secondary education. The relative merits of the essay and the objective examination are considered in connection with the problem of grades and grading systems. Enough elementary statistics are included to enable students to use intelligently the results of testing. Emphasis is placed upon the importance of an accurate interpretation of test data and upon the futility of indiscriminate testing.

*21-04 Educational Organization and Administration*—A study of the principles underlying the organization, administration, and supervision of secondary schools in the U.S.A. The course is illustrated with suitable problems taken from actual practice. It should be of special interest to students who contemplate teaching as a vocation.

*21-05 Comparative Education*—A discussion of the educational background and current theories and practices of England, France, and Germany. Emphasis is laid upon the bearing of European education on American practice. Much of the assigned reading is in current periodical literature, although a basic text is also used. Lectures, special reports, and class discussions comprise the media by which the course is conducted.

*21-06 Educational Sociology*—The course considers the relationship between education and sociology. Educational objectives are set up from the findings of sociological research and the traditional curriculum is examined in the light of these objectives with a view towards its reconstruction. A critical attitude is maintained toward philosophical implications which will inevitably arise in the course.

*21-07 Educational Philosophy*—A study of the relationship between the science of education and the philosophy of education is followed by a consideration of philosophies of education in the light of basic theses of the history of philosophy. Such topics as evolutionism, behaviorism, pragmatism, instrumentalism, and progressive education are viewed in the perspective of the history of philosophy.

*21-08 Principles of Secondary Education*—A critical study of the aims, objectives and functions of secondary schools. Relations of the junior high school, the senior high school, and the junior college to American life are discussed.

*21-09 Methods of Teaching in Secondary Schools*—A fundamental course in methods of teaching. Such topics as motivation, socialization, drill, specific techniques, attention and fatigue, use of books and laboratories are discussed.

## *English*

*30-01 English I*—A review of basic sentence structure and the grammatical functions of clauses and phrases, followed by a study of effective sentence writing, paragraph development, and reading techniques. Theme assignments are planned to develop practical skill in each of the phases studied.

*30-02 English I*—A study of the structure and organization of written compositions: outlining, development of compositions by phases, and the analysis of expository writings. Experimental work in each phase is carried out by means of theme assignments and readings.

*30-03 English I*—A study of the problems peculiar to each of the four main types of discourse: exposition, description, narrative, and argument. Theme work includes, in addition to these basic types, some assignments in the framing of reports and the writing of business letters.

*30-04 Introduction to Literature*—A study of the aims and techniques of various common types of literature: the play, the short story, lyrical and narrative poetry, and the literary essay. Instructional methods include assigned reading and the writing of short critical reports.

*30-07 Effective Speaking*—A study of the report as a means of oral and written presentation of technical data. Reports of various types are planned and written. Considerable class time is devoted to the presentation of oral reports and oral summaries of written reports.

*30-09 Report Writing*—A course on gathering, organizing, and arranging in standard form the material on technical reports.

*30-21 Advanced Composition*—A study of the craft of writing as applied to the shorter literary forms. Each student will be given considerable latitude in working in the field of his individual interest. Student manuscripts will be read in class.

*30-22 Advanced Composition*—A continuation of 30-21.

*30-23 Creative Writing*—For advanced students definitely interested in imaginative writing who have already proved their ability in 30-21 and 30-22 and who wish to continue their writing under supervision. Class instruction will be supplemented by individual conferences with the instructor.

*30-24 Creative Writing*—A continuation of 30-23.

*30-29 Foundations of the English Language*—A study of the complex origin of the English language, tracing historically the influences which have modified the Saxon base. The course includes a detailed examination of the grammatical characteristics of Greek, Latin, and Saxon, with a study of the roots and affixes which those languages have chiefly contributed to the formation of English words.

*30-30 Foundations of the English Language*—A continuation of 30-29. A study of the ways in which elements of the source languages have been modified toward the forms they have assumed in modern English.

*30-31 Western World Literature*—A survey of the principal writers of the ancient and medieval period. Assigned readings are supplemented by lectures on historical background and literary trends.

*30-32 Western World Literature*—A continuation of 30-31. This course is concerned with writers from the late sixteenth century to the present.

*30-33 Survey of English Literature*—A survey of English literature to 1800. After a brief study of the social and political background of each literary period, the writing of the period is considered, and the more important writers are studied and read in detail. The purpose of the course is to give the student an appreciation of English literature as a whole, and an intimate knowledge of its major figures.

*30-34 Survey of English Literature*—A survey of English literature from 1800 to the present century. The outstanding writers are read, studied, and related to the general background of nineteenth century England. The purpose of the course is to give the student an understanding of the writers who contributed most to the formation and development of modern literature in England.

*30-35 American Literature to 1860*—A survey of American literature from colonial times to the triumph of the transcendental movement in New England. The work of Bryant, Irving, Cooper, Poe, Emerson, Thoreau, Lowell, Holmes, Longfellow, and Melville will be emphasized.

*30-36 American Literature After 1860*—Continuing 30-35, the course will consider the rise of realism after the Civil War, the development of American humor, the appearance of local color writers, and modern trends since 1900.

*30-37 Saxon and Anglo-Norman Literature*—A survey of the literary production of England from about 600 A.D. to 1200. All the selections are read in modern English translations, but attention is given to the language characteristics of early and late West Saxon and Anglo-Norman writings.

*30-38 English Literature from 1200 to 1600*—A reading course to acquaint the student with the dominant types of literature during the Middle English and early modern period: lyrical, narrative, and satirical poetry; mystery and miracle plays, ballards; and prose romances.

*30-39 The Seventeenth Century in England*—An historical survey of the literary developments during the first half of the seventeenth century. Assigned readings in drama, lyrical poetry, and criticism are supplemented by lectures on general trends and minor authors not represented in the readings.

*30-40 The Seventeenth Century in England*—A continuation of 30-39 with special attention to the later works of Milton, the poetry of Dryden, and the theater of the Restoration.

*30-41 The Eighteenth Century in England*—An historical survey of the literary developments during the first half of the eighteenth century: the rise of popular journalism; the sentimental comedy; satire and realistic narrative; the beginnings of the novel.

*30-42 The Eighteenth Century in England*—A continuation of 30-41: the age of Johnson; late eighteenth century poets, novelists, and dramatists.

*30-43 Nineteenth Century Prose*—An examination of significant nineteenth century writers and their relation to the social, political, and literary currents of the time. The first semester will include consideration of such background workers as Paine and Godwin, the establishment of the great quarterlies, and the Romantic essayists, Lamb, Hazlitt, and DeQuincey.

*30-44 Nineteenth Century Prose*—A continuation of 30-43. Writers to be studied include Carlyle, Newman, Ruskin, Arnold, Morris, Huxley, Pater, and Stevenson.

*30-45 Nineteenth Century Poetry*—A study of Romanticism, its origins, its conflict with classicism, and its contributions to contemporary and later culture. The poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats will be examined appreciatively and critically.

*30-46 Nineteenth Century Poetry*—A study of the Victorian era with emphasis on Browning and Tennyson as artists and as interpreters of life. Lesser poets to be considered include Arnold, Clough, and the Pre-Raphaelites.

*30-47 The Modern Novel*—A survey of the modern and contemporary English and American novel, with emphasis on trends and changes in content and technique. Representative novels are read, and a few novelists are studied in detail.

*30-48 The Modern Drama*—A survey of English and American drama since 1900, considering representative plays and major dramatists and tracing the relationship between drama and history in the twentieth century.

*30-49 Modern Poetry*—A survey of the principal developments in the prosody, substance, and theory of poetry in England and America since 1912. The chief emphasis of the course will be on the work of the major poets of the period.

*30-51 Introduction to Journalism*—This course treats the functions of the editorial department and the general tasks of an "inside" man. The student is given extensive practice in the re-writing of news stories.

*30-52 Introduction to Journalism*—The problems of reporting and news-writing, with written assignments in all types of spot news reporting.

*30-53 Techniques of Journalism*—Editing the news. The writing of editorials, feature articles, and columns.

*30-54 Techniques of Journalism*—A general practice course in newspaper writing, the covering of special assignments, and editorial problems.

*30-61 Shakespeare*—The Elizabethan period, sixteenth century London, the Shakespearean stage and audience, and the actors' companies will be discussed. Shakespeare's life and his development as a dramatist will be carefully considered. Five plays will be intensively studied.

*30-62 Shakespeare*—Lectures will be given on Shakespeare's language, the text of the plays, Shakespearean criticism, editors' problems, etc. Four plays will be intensively studied. The sonnets will be read and discussed.

*30-63 Chaucer*—A study of the Canterbury Tales, with careful training in Middle English vocabulary and the rhythms and devices of Chaucer's poetry.

*30-64 Chaucer*—A continuation of 30-63, principally concerned with *Troilus and Criseyde, The House of Fame, The Parliament of Fowls,* and some parts of *Boece.*

*30-71 Seminar*—Independent investigation of a selected topic together with intermediate research reports. May be elected with the consent of the department by qualified seniors majoring in English.

*30-72 Seminar*—A continuation of 30-71. A final report is required which summarizes the research of the year.

## Geology

*13-01 General Geology*—A study of earth movements and various terrestrial applications of solar energy. Lectures on fundamental general facts as to origin and movements of the earth, weathering, work of winds, underground and surface waters, glaciers and the glacial period, lakes and swamps, and vulcanism.

*13-02 General Geology*—Course 13-01 is continued with such topics as mountain formation, oceans, oceanic life, atmosphere touching upon meteorology. A considerable portion of time is given to the study of igneous, sedimentary and metamorphic rocks, supplemented by laboratory and field work.

*13-03 Historical Geology*—A review of the beginning of the earth, its development and historical significance of rock characters. This is followed by a study of the pre-Cambrian Paleozoic and the early Paleozoic sub-era.

*13-04 Historical Geology*—Continuation of 13-03 taking in the late Paleozoic sub-era, and the Mesozoic and Cenozoic periods, and continuing through the geologic history of man.

## Government

*22-01 American Government and Politics*—The study of our National Government with respect to its organization, functions, constitutional powers, and limitations.

*22-02 American Government and Politics*—A continuation of 22-01. Particular attention is paid to the legislative, administrative, and judicial machinery under the party system of government. The problems of bureaucracy are analyzed.

*22-03 American Government and Politics*—A study of the relationships of our federal, state and municipal governments. Consideration is given to the various types of state and municipal governments with respect to the state and local agencies for carrying out the executive, legislative, and judicial functions of government in a democratic country.

*22-11 Comparative Government*—The older governments of Europe, those principally of Great Britain and France, but also of Switzerland and the Scandinavian countries, are described and analyzed in this course. Institutions are compared in these various states with reference to America and the newer governments of Europe.

*22-12 Comparative Government*—A study of the newer governments of Europe, as found in Germany, Italy, and the Soviet Union. Democracy and dictatorship are analyzed as different modes of life and rule. These states are compared to each other, to the older governments of Europe, and to the United States.

*22-13 Origins of Political Theory*—A survey of political philosophy from Plato and Aristotle to Bentham. The nature, origin, forms, and ends of the state and government are covered.

*22-14 Modern Political Theory*—A critical study is made of the major developments in political theory since Bentham, with special reference to the influence of these developments upon American politics and political institutions. Attention is paid to the modern conflict between the democratic and the totalitarian conceptions of the state.

*22-15 American Constitutional Law*—After a careful study of the influences affecting the framing of the Constitution, attention is turned to the leading constitutional principles of the American government as developed through judicial interpretation.

*22-16 American Constitutional Law*—A continuation of 22-15. Primary emphasis is placed upon the relation of constitutional law to present-day problems, with particular reference to such items as "due process of law" and "interstate commerce."

*22-17 International Law*—A study of the essentials of public law governing the relations between sovereign states.

*22-18 International Relationships*—A consideration of selected international problems arising from the conflict of national policies and interests. The role of international organization receives special attention.

*22-20 Public Administration*—An introduction to the general principles of public administration in modern government with emphasis upon the organization and operation of administrative agencies in the United States.

*22-21 Public Administration*—A continuation of 22-20. Emphasis is placed upon the policy-making aspects of public administration with particular reference to such problems as personnel management, budgeting and accounting, purchasing, and planning.

## *History*

*23-01 History of Civilization*—This is primarily a background course. Introductory lectures deal with primitive society, the development of language and writing, and the early contributions of Egypt and Asia. More detail is given to the structure of Greek and Roman society and the rise of the Christian Church.

*23-02 History of Civilization*—A continuation of 23-01. This course considers the decline of the Roman Empire, the barbarian invasions of the Empire, the growth of Islam, life in the early Middle Ages, the growth of monarchies in Europe, and the medieval church.

*23-03 History of Civilization*—The Renaissance and the Reformation receive extended attention in this course. Stress is placed upon the art and literature of the era as well as the social, economic, and political developments.

*23-04 History of Civilization*—A continuation of 23-03. The chief topics of the course include the economic revolution, the Age of Reason in France and England, the Old Regime and the Revolution in France, and the growth of science and industrialism.

*23-11 Europe, 1789–1870*—This course aims at describing and interpreting the development of European states from the French Revolution to 1870. Major topics include the Metternich system, the emergence of French Republicanism, and the unification of Italy and Germany. Non-political factors receive much attention throughout the course.

*23-12 Europe, 1870–1920*—The international relationships which precipitated the tragedy of 1914 are considered. The rise of militarism and nationalism, secret diplomacy, propaganda and the press, the "incidents" which led to the World War, the conduct of the war, and the peace treaties, are discussed in this course.

*23-13 England to 1688*—This course surveys the political, social, religious, and economic development of England to the Revolution of 1688. Political history receives the major emphasis, but stress is placed upon the rise of the English institutions which represented England's outstanding contribution to civilization.

*23-14 England Since 1688*—A continuation of 23-13. A study is made of Queen Anne's England, the policies of Walpole, England's part in European politics, the age of the first Reform Bill, English imperialism, and Victorian society.

*23-15 English Constitutional History*—This course is devoted to a consideration of the English constitution and of the common law; local government vs. central government; the origin and growth of Parliament; the development of the British cabinet system; and a comprehensive study of statutes and documents.

*23-16 American Constitutional History*—In this course a study is made of the historical development of the United States Constitution with particular emphasis on its progressive adaption to a changing social and economic order.

*23-17 The United States to 1865*—This course is an interpretation of the events which shaped the American nation to the Civil War. Social customs, economic influences, racial contributions, and humanitarian movements are not neglected, though the political history is stressed.

*23-18 The United States Since 1865*—Major attention is given to the social, economic, and political foundations of recent history in this survey of the transition of America from an agricultural to an urban industrialized society since the Civil War. Consideration is given to the problems arising with the emergence of America as a world power.

*23-19 Latin American History*—This course deals with the European background of Spanish and Portuguese colonization in the New World, the exploits of the conquistadores, the Indian civilizations, colonial institutions, and the forces which gave rise to the revolutions in the early nineteenth century.

*23-20 Latin American History*—This course continues 23-19, and describes the Wars of Independence and the rise of the republics. A study is made of the international relations of the Latin American countries, the Monroe Doctrine, and the Pan-American conferences.

*23-21 Far Eastern International Relations, 1840—1900*—Between 1840 and 1900 the United States and the European powers developed their several foreign policies towards China and Japan. Japan succeeded in developing a policy toward China and the West. The Chinese Empire failed to develop a consistent policy and was nearly dismembered. This course concerns the above developments.

*23-22 Far Eastern International Relations Since 1900*—Since 1900 Japan emerged as a world power and embarked upon a career of imperialism. China at last developed a foreign policy. With the close of the first World War, European imperialism waned. The United States tried to act as umpire. War resulted. This course concerns these developments.

*23-23 Recent European History*—A consideration of the problems of Europe arising out of the first World War and of the background of the second World War.

## *Mathematics*

*14-01 College Algebra*—The study of algebra is scheduled to begin with the solution of the quadratic equation, simultaneous quadratics, and equations in quadratic form. However, a rapid but thorough review of the fundamentals of algebra precedes this. The solution of the quadratic is followed by a detailed study of the theory of exponents. Then follow radicals, series, variation, inequalities, and the elementary principles of the theory of equations. Considerable time is given to plotting and the use of graphs in the solution of equations. The elementary theory of complex numbers is also covered.

*14-02 Trigonometry*—This is a complete course in trigonometry and should enable the student to use all branches of elementary trigonometry in the solution of triangles as well as in the more advanced courses where the knowledge of trigonometry is essential. Some of the topics

covered are the trigonometric ratios; inverse functions; goniometry; logarithms; circular measure; laws of sines, cosines, tangents, half angles; solution of oblique and right triangles; transformation and solution of trigonometric and logarithmic equations. Considerable practice in calculation of practical problems enables the student to apply his trigonometry to problems arising in practice at an early stage. Additional work, graphical and algebraic, is done with the complex number, introducing De-Moivre's theorem and the exponential form of the complex number.

*14-03 Analytic Geometry*—This being a basic course in preparation for any further study of mathematics, it requires a thorough knowledge of the fundamentals of algebra. The course covers cartesian and polar co-ordinates; graphs; the equations of simpler curves derived from their geometric properties; thorough study of straight lines, circles, and conic sections; intersections and curves; transformation of axes; plotting and solution of algebraic equations of higher order and of exponential trigonometric and logarithmic equations; loci problems. The general equation of the second degree is thoroughly analyzed in the study of conic sections.

*14-04 Introduction to Calculus*—Explicit and implicit functions, dependent and independent variables, some theory of limits, continuity and discontinuity are given special attention from both the algebraic and the geometric points of view. Some theorems on the infinitesimal are introduced, and a study is made of infinity and zero as limits. Relative rates of change, both average and instantaneous, and the meaning of the slope of a curve follow. The differential and the derivative as applied to algebraic functions with the geometric interpretation are then studied. Tangents to curves of the second degree follow here. Simple applications with interesting practical problems help to develop the interest here and lay a solid foundation for the study of the calculus. The introduction of the differential at the same time with the derivative helps considerably to bridge the large gap which usually exists when the student passes from the study of the elementary analytic geometry to the infinitesimal of calculus.

*14-05 Differential Calculus*—The differential is introduced and defined at the outset of the course together with the derivative; geometric and practical illustrations are given of both; and both are carried along throughout the course. The work in the course consists of differentiation of algebraic, trigonometric, exponential, and logarithmic functions, both explicit and implicit; slopes of curves, maxima and minima with applied problems; partial differentiation; derivatives of higher order; curvature; points of inflection; related rates; velocities, acceleration; expansion of functions; series. Although the subject matter deals with considerable theory, constant sight is kept of the practical application of the theory. The geometric interpretation of every new subject is carefully defined and problems are continually solved dealing in practical applications of the theory in geometry, physics, and mechanics.

*14-06 Integral Calculus*—This is a continuation of Calculus 14-05, and deals with integration as the inverse of differentiation as well as the limit of summation. The topics covered are methods of integration; use of integral tables; definite integrals; double and triple integrals; areas in rectangular and polar co-ordinates; center of gravity; moment of inertia; length of curves; volumes of solids; areas of surfaces of revolution; volumes by triple integration; practical problems in work, pressure, etc., depending on the differential and integral calculus for solution; solution of simpler differential equations.

*14-07 Differential Equations I*—The elementary theory and solution of ordinary differential equations is offered here as a general course in mathematics. Although principally a problem course in solving differential equations, properties of equations and of their solutions are deduced, and applications to the various fields of science are analyzed.

*14-08 Differential Equations II*—Special cases of first order equations are considered, and a fuller treatment of first order equations of higher degree leads to a consideration of envelopes, special loci, and particular curves. The general second order linear equation is studied, and the several well-known methods of attack are presented. Solution in series form of equations whose primitives are not made up of classified functions is studied. Elementary partial differential equations of the first and second orders, leading to a presentation of Fourier's series, conclude the course.

*14-10 Analytic Mechanics*—Fundamental concepts and methods of classical mechanics. Composition and resolution of force systems; centroid and moment of inertia; equilibrium; relative velocity and acceleration; energy, impulse, momentum, and work.

If time permits, some study is made of Lagrange equations and Hamilton's principles.

*14-11 Curve Analysis*—The topics covered are analysis of empirical data, curve fitting, least squares, nomographic charts and general analysis of equations of curves.

*14-12 Modern Geometry*—The course offers a brief outline of the history of geometry, especially in the nineteenth century, analysis of geometry of the triangle and circle; systems of co-ordinates; linear dependence; transformations; principle of duality; poles and polars; harmonic division; cross ratios; and conical projection. Special theorems include those of Desargues, Pascal, and Brianchon.

*14-13 Spherical Trigonometry*—This is a complete course in the study of spherical trigonometry, solving right and isosceles triangles; Napier's rules; laws of sines; cosines, half-angles, and half-side formulas; Napier's analogies. A detailed solution of oblique spherical triangles including areas follows. Considerable time is spent on the celestial sphere and the

astronomical triangle and on navigation, calculation of latitude and longitude, bearing, and time.

*14-14 History of Mathematics*—In this course a survey is made of the development of the various branches of mathematics, and attention is given to the lives of men who have made outstanding contributions to mathematical science.

*14-15 Advanced Calculus*—The course is essential for all students who expect to study more advanced work in the field of mathematics. The various topics include special methods of integration, change of variable, hyperbolic functions, continuity and related theorems, theory and application of the infinitesimal, Taylor's series, infinite series in two variables, Fourier series, applications of partial differentiation envelopes, evolutes.

*14-16 Advanced Calculus*—This is a continuation of 14-15. The types of topics covered are maxima and minima in three dimensions, Jacobians, curvilinear co-ordinates, special definite and improper integrals, differentiation of integrals, Beta Function, Gamma Function, Bessel's Function, line integrals, surface integrals, complex variable, and elliptic integrals and functions.

*14-17 Infinite Series*—Study of limits; infinite series; tests of various types of convergence and divergence; algebraic operations with series; integration and differentiation of series; applications and use of special series, as power and Fourier series. Some solution of differential equations as done by infinite series.

*14-18 Theory of Equations*—This course is devoted more to the theory and analysis of equations and roots than to actual solutions. The properties of polynomials and continuity are studied. The complex number in algebraic, geometric, and exponential form is reviewed. The solutions of equations of higher degree are discussed, discriminants analyzed, and various theorems on roots studied. Proof is given of the fundamental theorem of algebra. A complete analysis of n equations in m unknowns is made, including the theory and use of determinants. The relations of roots and coefficients and some symmetric functions are included.

*14-20 Special Topics*—Here the student practices the application of his mathematics to special applied problems in the various fields of science. The course may require considerable reference work in special topics chosen so as to be of particular interest to the individual student. (For seniors only.)

*14-21 Basic Mathematics I*—A course in algebra review in preparation for work in trigonometry and analytic geometry. Many topics covered in high school are reviewed, and further work is done in the more advanced topics. The reasoning underlying the processes of algebra is

emphasized so that the student will find the work in algebra is not memory work but is a process of simple, logical reasoning.

*14-22 Basic Mathematics II*—A course in plane trigonometry, including logarithms, covering the usual work through the solution of triangles and applications.

*14-23 Basic Mathematics III*—This course continues on with more special topics from the two preceding basic mathematics courses. It also introduces the subject of analytic geometry with considerable emphasis on the plotting of graphs and the analysis of the equations covered in the two preceding courses.

*14-25 Mathematics of Finance*—This course starts with the algebra and logarithms necessary for the understanding and use of the formulas developed in business mathematics. Then the subjects covered are interest, discount, annuities, sinking funds, depreciation, amortization, valuation of bonds, the use of graphs, the interpretation of statistical data, and insurance.

*14-28 Mathematical Statistics*—The course is designed to develop the statistical quantities used for the description of data, together with data analysis made possible by the use of these statistical quantities. The nature of the course is such that it will have applications in those fields where working information is obtained by the collection and analysis of data. Included topics are averages, moments, measures of dispersion, curve fitting, correlation theory and the normal error function.

*14-29 Mathematical Statistics and Probability*—This is a continuation of 14-28. Here are developed the basic principles underlying the applications of mathematical statistics to many practical problems of importance in the fields of applied science, research, and industry. Included topics are elements of probability, binomial distribution, Poisson exponential function, normal probability function, sampling theory, tests of statistical hypotheses.

## *Modern Languages*

### *French*

*31-01 Elementary French*—A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of basic vocabulary and current idiomatic expressions.

*31-02 Elementary French*—A continuation of 31-01 with emphasis on the more difficult points of French grammar. Reading of simple texts.

*31-03 Elementary French*—A continuation of 31-02. Reading of texts of progressively increasing difficulty, with oral and written exercises on the material read. Some of the texts are assigned for outside reading.

*31-04 Elementary French*—A continuation of 31-03. Practice in conversation dealing with the various aspects of everyday life.

*31-11 Introduction to French Literature*—This course aims to provide a linguistic and cultural background for the study of French literature, besides acquainting the student with representative works of some of the more important French authors. The work of the first term consists of a thorough review of grammar, phonetic drill, and oral practice based on suitable texts.

*31-12 Introduction to French Literature*—A continuation of 31-11. Most of the time is devoted to the study of literary selections dealing with French customs, institutions, geography, and history, with oral practice based on the material read. Vocabulary building, study of idioms, and outside reading.

*31-13 Introduction to French Literature*—A continuation of 31-12. Selected readings from representative modern authors. Oral practice and memorizing of selected passages. Outside reading.

*31-14 Introduction to French Literature*—A continuation of 31-13. Conversational practice. The subject matter will deal with the ordinary activities of everyday life and contemporary problems.

*31-15 Intermediate French*—In this course several texts of average difficulty are read and studied. The work includes a thorough review of grammar, oral practice based on the reading matter, memorizing of selected passages, dictation, study of idioms, vocabulary building and outside reading.

*31-16 Intermediate French*—A continuation of 31-15, with an increasing amount of both class and outside reading.

*31-21 Modern French Literature*—A study of the chief trends in French literature since 1850. Significant works of representatives of the various literary movements are read and analyzed. The course is concerned mainly with the short story and the novel. Collateral reading and reports.

*31-22 Modern French Literature*—A continuation of 31-21. The major part of the course is devoted to the study of the drama, with the remainder given to French verse of the period. Collateral reading and reports.

*31-23 French Classicism*—This course is designed to furnish a comprehensive survey of the background and development of French literature of the seventeenth century and to aid the student in a critical interpretation of the most significant works of the period. The reading is mainly

from the works of Malherbe, Descartes, Pascal, La Fontaine, and Boileau. Collateral reading and reports.

*31-24 French Classicism*—A continuation of 31-23. The dramatic works of Corneille, Molière, and Racine receive the major attention.

*31-25 French Romanticism*—A study of the origins and development of the Romantic movement in French literature. The readings include significant selections from the novels of the principal writers of the Romantic school, as well as some of the more important Romantic dramas.

*31-26 French Romanticism*—Continuing 31-25, the course pursues further the study of the Romantic drama. The latter part of the term is devoted to the reading of selections of poetry from the works of Lamartine, Hugo, Musset, and others.

*31-31 Advanced Composition and Conversation*—The work of this course will include, besides written and oral composition, a systematic review of the most important and the more difficult points of French grammar, a brief historical survey of the development of the French language, and a practical study of French phonetics and pronunciation. Current events and other matters of contemporary interest will furnish the topics for discussion and conversation.

*31-32 Advanced Composition and Conversation*—A continuation of 31-31.

## German

*32-01 Elementary German*—A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of basic vocabulary and current idiomatic expressions.

*32-02 Elementary German*—A continuation of 32-01 with emphasis on the more difficult points of German grammar. Reading of simple texts.

*32-01A Elementary German*—A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of basic vocabulary and current idiomatic expressions.

*32-02A Elementary German*—A continuation of 32-01A. Most of the time is devoted to the reading of simple texts, with oral practice based on the material read.

*32-03 Elementary German*—A continuation of 32-02. Reading of texts of progressively increasing difficulty, with oral and written exercises on the material read. Some of the texts are assigned for outside reading.

*32-04 Elementary German*—A continuation of 32-03. Practice in conversation dealing with the various aspects of everyday life.

*32-11 Introduction to German Literature*—This course aims to provide a linguistic and cultural background for the study of German literature, besides acquainting the student with representative works of some of the more important German authors. The work of the first term consists of a thorough review of grammar, phonetic drill, and oral practice based on suitable texts.

*32-12 Introduction to German Literature*—A continuation of 32-11. Most of the time is devoted to the study of literary selections dealing with German customs, institutions, geography, and history, with oral practice based on the material read. Vocabulary building, study of idioms, and outside reading.

*32-13 Introduction to German Literature*—A continuation of 32-12. Selected readings from representative modern authors. Oral practice and memorizing of selected passages. Outside reading.

*32-14 Introduction to German Literature*—A continuation of 32-13. Conversational practice. The subject matter will deal with the ordinary activities of everyday life and contemporary problems.

*32-15 Intermediate German*—In this course several texts of average difficulty are read and studied. The work includes a thorough review of grammar, oral practice based on the reading matter, memorizing of selected passages, dictation, study of idioms, vocabulary building, and outside reading.

*32-16 Intermediate German*—A continuation of 32-15, with an increasing amount of both class and outside reading.

*32-21 Modern German Literature*—A survey of the main currents of German literature since 1880. Representative works of the leading authors of the period are read and interpreted. The course deals chiefly with the short story and the novel. Collateral reading and reports.

*32-22 Modern German Literature*—A continuation of 32-21. The drama and poetry receive the main emphasis. Collateral reading and reports.

*32-23 The Classical Period of German Literature*—This course aims to trace the development of German literature during the second half of the eighteenth century beginning with the Storm and Stress period. The works of Lessing, Goethe, and Schiller will receive the major emphasis.

*32-24 The Classical Period of German Literature*—A continuation of 32-23. The readings will consist mainly of the later works of Goethe and Schiller.

*32-25 German Literature of the Nineteenth Century*—This course will consider the chief tendencies in German literature from the beginning of Romanticism to the coming of Naturalism. Representative works of the principal writers of the period will be read and analyzed.

*32-26 German Literature of the Nineteenth Century*—A continuation of 32-25. Among the works to be read will be some of the outstanding dramas of the latter half of the century.

*32-31 Advanced Composition and Conversation*—The work of this course will include, besides written and oral composition, a systematic review of the most important and the more difficult points of German grammar, a brief historical survey of the development of the German language, and a practical study of German phonetics and pronunciation. Current events and other matters of contemporary interest will furnish the topics for discussion and conversation.

*32-32 Advanced Composition and Conversation*—A continuation of 32-31.

## *Spanish*

*33-01 Elementary Spanish*—A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of basic vocabulary and current idiomatic expressions.

*33-02 Elementary Spanish*—A continuation of 33-01, with emphasis on the more difficult points of Spanish grammar. Reading of simple texts.

*33-01A Elementary Spanish*—A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of basic vocabulary and current idiomatic expressions.

*33-02A Elementary Spanish*—A continuation of 33-01A. Most of the time is devoted to the reading of simple texts, with oral practice based on the material read.

*33-03 Elementary Spanish*—A continuation of 33-02. Reading of texts of progressively increasing difficulty, with oral and written exercises on the material read. Some of the texts are assigned for outside reading.

*33-04 Elementary Spanish*—A continuation of 33-03. Practice in conversation dealing with the various aspects of everyday life.

*33-11 Introduction to Spanish Literature*—This course aims to provide a linguistic and cultural background for the study of Spanish literature, besides acquainting the student with representative works of some of the more important Spanish authors. The work of the first term consists of a thorough review of grammar, phonetic drill, and oral practice based on suitable texts.

*33-12 Introduction to Spanish Literature*—A continuation of 33-11. Most of the time is devoted to the study of literary selections dealing with Spanish customs, institutions, geography, and history, with oral practice based on the material read. Vocabulary building, study of idioms, and outside reading.

*33-13 Introduction to Spanish Literature*—A continuation of 33-12. Selected readings from representative modern authors. Oral practice and memorizing of selected passages. Outside reading.

*33-14 Introduction to Spanish Literature*—A continuation of 33-13. Conversational practice. The subject matter will deal with the ordinary activities of everyday life and contemporary problems.

*33-15 Intermediate Spanish*—In this course several texts of average difficulty are read and studied. The work includes a thorough review of grammar, oral practice based on the reading matter, memorizing of selected passages, dictation, study of idioms, vocabulary building, and outside reading.

*33-16 Intermediate Spanish*—A continuation of 33-15, with an increasing amount of both class and outside reading.

*33-21 Spanish Literature of the Golden Age*—This course deals with the Spanish prose of the sixteenth and seventeenth centuries, particularly the Don Quixote and the Novelas Ejemplares. Lectures, translation, and collateral reading.

*33-22 Spanish Literature of the Golden Age*—A continuation of 33-21, with emphasis on the drama of Lope de Vega, Tirso de Molina, and Calderon. Lectures, translation, and collateral reading.

*33-23 Modern Spanish Literature*—This course aims to acquaint the student with the literature of Spain during the last quarter of the eighteenth century and the first half of the nineteenth. The chief emphasis is placed on the romantic poetry and drama. Lectures, translation, and collateral reading.

*33-24 Modern Spanish Literature*—A continuation of 33-23, this course is devoted to Spanish literature of the second half of the nineteenth century, with emphasis on the realistic novel. Lectures, translation, and collateral reading.

*33-25 Modern Spanish American Literature*—The purpose of this course is to acquaint the student with the general trends of Spanish American literature. Plays, essays, and novels that reflect the economic and social problems of our neighbors to the south will receive the chief attention. Lectures, translation, and collateral reading.

*33-26 Modern Spanish American Literature*—A continuation of 33-25, this course is devoted to the literature of Mexico and Central America, and particularly the works of Ruben Dario.

*33-31 Advanced Composition and Conversation*—The work of this course will include, besides written and oral composition, a systematic review of the most important and the more difficult points of Spanish grammar, a brief historical survey of the development of the Spanish language, and a practical study of Spanish phonetics and pronunciation. Current events and other matters of contemporary interest will furnish the topics for discussion and conversation.

*33-32 Advanced Composition and Conversation*—A continuation of 33-31.

## *Philosophy*

NOTE: In addition to the courses listed, 26-13 and 26-14 Social Ethics may be counted as courses in Philosophy.

*24-01 Introduction to Philosophy*—This introductory course combines the historical and systematic approaches to the subject. The historical treatment includes a survey of the chief philosophers and the development of basic philosophical ideas. The systematic treatment presents the several types of philosophy, such as realism, materialism, idealism, and pluralism. The place of philosophy is considered in its relation to ethics, religion, and natural sciences. The course both acquaints the student with facts about philosophy and trains him to think philosophically.

*24-02 Problems of Philosophy*—The chief systems of thought are applied to what may be termed the persistent problems of philosophy. The problems are to be found in the fields of epistemology, teleology, and metaphysics. The following topics suggest representative problems which will be studied: the relation between mind and body, the nature and extent of freedom of the will, the validity of knowledge, and the bearing which the more recent views in physics and psychology have upon related philosophical problems.

*24-03 History of Philosophy*—Beginning with the early Greek age period, the course traces the development of philosophical thought through the patristic and scholastic periods. A study is made of the transition from medieval to modern philosophy.

*24-04 History of Philosophy*—The first half of the course is a study of the period from Bacon to Kant; the second half begins with the time of Kant and ends with a consideration of present-day philosophers and their systems of thought.

*24-05 Philosophy of Religion*—Fundamental questions of religious belief are examined in the light of philosophy. Modern religions are compared with respect to their views on the nature of the Deity, the meaning of

life, and the relationship between man and God. Further topics for study include the question of the validity of mysticism and intuitive knowledge of religious truth, the immortality of the soul, the meaning of the supernatural, the presence of natural evil, and the relation of morality to religion.

*24-06 Logic*—Formal logic is subordinated in this course to the more practical consideration of the methods of critical and reflective thought. Common fallacies in logic are indicated, and the student is given frequent exercises in correct reasoning. Attention is given to the principles of induction, deduction, verification, syllogism, and assumption. To assist the student to think clearly and correctly is the essential purpose of this modified course in logic.

## *Physical Education*

*16-01 Hygiene*—This course aims to provide the student with fundamental information which will be useful in developing and maintaining good health and in the practice of personal hygiene. The course includes enough of the fundamentals of physiology and anatomy to enable the student to understand such parts of the work as require some knowledge of these subjects.

*16-02 Hygiene*—A continuation of 16-01, completing a study of the function and care of the several systems of the body.

*16-10 Physical Training*—All first year men students are required to take Physical Training. Health, strength, and vitality do not come by chance but by constant attention to those factors involved in their development. It is very essential for the student to acquire good habits of living.

The work in the course includes a formal calisthenic program, special exercise classes for the correction of postural defects, participation in the regular athletic program, including baseball, basketball, football, hockey, track, and many types of informal games. All members of the class are also required to learn to swim.

Students wishing to be excused from Physical Training because of physical defects are required to present a petition to the faculty supported by a physician's certificate.

*16-11 Physical Training*—A continuation of 16-10.

*16-12 Physical Training*—A continuation of 16-11.

*16-21 Principles of Physical Education*—The course considers the place of physical education in the educational program in the United States. The development of physical education programs based on the changes in society from primitive to modern times is discussed, careful attention being given to the needs of the individual, as well as to the needs of the group. Relationship between medical service and the physical education department is considered, and methods of co-ordination between these

two important departments are investigated. The history of physical education, in so far as it affects the modern program, is included in the course. Factors such as economic, social and political influences which have an important effect on the conduct of the program are also considered. School health programs are discussed, with particular emphasis upon the medical and physical examinations and tests and the procedures which follow. Diagnostic and remedial techniques, classroom hygiene, and principles of preventive and corrective exercise are discussed. The course also includes a consideration of the proper place occupied by interschool and intercollegiate athletics in the physical education program.

Required of all students electing Physical Education as a minor field.

*16-22 Play and Recreation*—The purpose of this course is to prepare students for leadership of leisure-time activities. It considers the biological and sociological aspects of play and its increasing importance in modern life. From a practical point of view the course deals with the problems faced by the director of leisure-time activities in the community, in the school, or on the playground. The course should be of special interest to students who contemplate entering social work or teaching.

*16-23 History of Physical Education*—To provide a valuable background for students in this field, this course traces the whole history of physical education from the days of the Greeks and the Romans up to the present. Attention is given to a number of special systems of training which have been developed in Europe.

The course is required of all students electing Physical Education as a minor field.

*16-24 Administration of Physical Education*—This course is designed to acquaint students in the field of physical education with many of the administrative problems which are likely to arise in connection with their work. The subject matter includes a consideration of the objectives of the physical education program, personnel required, and various allied subjects, such as gymnasia, athletic fields, and the construction and maintenance of these units. The conduct of the athletic program including requirements for equipment, arrangements of schedules, coaching, meets, etc., is also included.

Required of all students electing Physical Education as a minor field.

*16-25 Football*—This course is designed to furnish the student interested in football coaching with a thorough knowledge of the sport. Careful consideration is given to the fundamentals in discussing the plays of each position in the line and backfield. Various well-known offensive and defensive systems are discussed for the purpose of considering their general merits, as well as adaptations to particular situations. Training and conditioning, rules and interpretation, and officiating are given proper attention.

*16-26 Track and Field Events*—The course considers the care and training of track athletes. Practice schedules, selection of material, conduct of meets, etc., are discussed. The viewpoint from which the topics are treated is that of the student of coaching technique. In connection with this course, action pictures taken from actual performances by world champions, together with moving pictures, are of great value in demonstrating the style and technique of track and field events.

*16-27 Basketball and Baseball*—Various systems in use throughout the country are compared and contrasted. Team play, offense, defense, signal systems, training and conditioning, rules, and officiating are among the topics studied. The student in this course should acquire a thorough knowledge of all phases of the sports.

## *Physics*

*15-01 Physics*—A study of the fundamental principles of mechanics. The topics treated are kinematics, dynamics, and statics.

*15-02 Physics*—This course completes the study of mechanics, and starts the subject of electricity and magnetism. Energy, power, machines, vibratory motion, elasticity, fluids, magnetism and electrostatics are studied.

*15-03 Physics*—Continues the subject of electricity. The topics covered are resistivity, circuits, electromagnetism, magnetic circuits and condensers.

*15-04 Physics*—Completes the study of electricity. Basic principles of alternating current generation and series circuits, thermoelectric, photoelectric, and thermionic effects, and electromagnetic radiation are the topics studied.

*15-05 Physics*—A first course in the study of light, covering all the details within the scope of standard college texts on the subject. Lectures, demonstrations, and laboratory experiments on selected topics in mechanics and light.

*15-06 Physics*—A study of wave motion, sound and heat. Lectures, demonstrations, and laboratory experiments, the latter covering topics in sound, heat, and electricity.

*15-07 Survey of Physical Sciences*—This sequence of courses is designed to give students who are majoring in nonscience fields an understanding of the contributions and place of the physical sciences in contemporary civilization. In this course attention is directed to the fundamental phases of physics. The classwork will be supplemented by demonstrations and motion pictures.

*15-08 Survey of Physical Sciences*—A continuation of 15-07, emphasizing the various phases of physics. Everyday applications of physics in the household are stressed.

*15-09 Survey of Physical Sciences*—In this course consideration is given to the basic processes of chemistry and their significance. The latter part of the term is devoted to topics in astronomy.

*15-10 Survey of Physical Sciences*—The contribution of geology to an understanding of our physical world is the subject of this course. Certain aspects of meteorology receive attention.

*15-11 General Physics*—A study of the fundamental principles of mechanics. Lectures and demonstrations only.

*15-12 General Physics*—The topics covered are heat, wave motion, sound and light. In addition to lectures and demonstrations the student performs experiments in the laboratory illustrating the above topics and those covered in 15-11.

*15-13 General Physics*—A thorough study of the basic principles of electricity and magnetism. Lectures, demonstrations, and laboratory experiments.

*15-14 Advanced Physics*—Selected topics in electricity, magnetism, and basic electronics. For chemistry majors only.

*15-15 Advanced Physics*—Selected topics in optics. For chemistry majors only.

*15-20 Optics*—This is a course in the more advanced forms of geometrical optics and the study of physical optics.

*15-21 Optics*—Continuing 15-20, a detailed study is made of physical optics with some time spent on modern spectroscopic theory.

*15-22 Acoustics*—A complete mathematical study of the modes of vibration of strings, pipes, membranes, and a consideration of vibrating systems in general.

*15-23 Acoustics*—A course in the application of the principles of 15-22 to the problems of speech, audition, sound, filters, musical instruments, and the acoustics of auditoriums.

*15-24 Electronics*—This course is designed to make the student familiar with the principles, operation and application of electronic devices. Direct current circuits, alternating current circuits, measuring devices, thermionic tubes, and electronic principles are studied.

*15-25 Electronics*—Continuing the work of the first term, audio amplifiers and oscillators, high frequency amplifiers and oscillators, frequency measurements, photo cells, detectors, radio, and some special applications are studied.

*15-26 Modern Physics*—Consideration is given to molecular relations, and then to atomic structure, quantum mechanics, and allied subjects.

*15-27 Modern Physics*—Radioactivity, artificial transmutation, nuclear structure, and the devices for studying these phenomena are here presented. Some time is also given to the Stark, Zeeman, and Raman effects, and to X radiation and cosmic rays.

*15-65 Thesis*—See statement on Theses, page 123.

*15-66 Thesis*—A continuation of 15-65.

*15-101 Theoretical Physics*—Vector analysis, dynamics, hydrodynamics, thermodynamics, statistical mechanics.
(*For graduate students only.*)

*15-102 Theoretical Physics*—Kinetic theory of gases, electrical theory, magnetic theory, optics, spectra.
(*For graduate students only.*)

*15-103 Quantum Mechanics*—Quantum phenomena, Schrodinger equation, potential barriers, classical atomic dynamics, linear harmonic oscillator, rigid rotator.
(*For graduate students only.*)

*15-104 Quantum Mechanics*—The hydrogen atom, Van der Waal's forces, perturbation theory, the helium atom, the hydrogen molecule, valence bonds, radiation.
(*For graduate students only.*)

*15-105 Applied Mathematics*—Elliptical integrals, matrices, algebraic and trigonometric series, line and surface integrals, some differential equations of physics.
(*For graduate students only.*)

*15-107 Graduate Thesis*—Thesis work for graduate students.

*15-108 Graduate Thesis*—Thesis work for graduate students.

*15-109 Graduate Thesis*—Thesis work for graduate students.

*15-110 Graduate Thesis*—Thesis work for graduate students.

## *Psychology*

*25-01 Introductory Psychology*—An elementary study of the structure, functions, and laws of mental life. The course considers the special relation of psychology to the social sciences; the scientific approach to a study of mental processes; the dynamics of animal and human behavior; the relationship between the individual's environment, his response mechanisms, and his personality; the biological and social sources of drives, desires, wishes, and incentives and their relation to interest, effort, adjustment, and maladjustment.

*25-02 General Psychology*—The course makes a systematic study of the psychological mechanisms underlying human behavior and it presents the more important theories of thought and action. It deals with the neurophysiological and psychological mechanisms involved in learning, memory, thought, imagination, motivation, emotion, sensation, and perception; the nature and extent of individual differences; aptitudes and aptitude testing. It emphasizes the practical application of psychological principles to mental and social adjustment. It presents the main problems in psychology and gives the points of view of the different schools of thought.

*25-11 Individual Differences*—This course is a prerequisite to most advanced courses. Differences in behavior patterns will be considered in relation to environment, heredity, race and training. An introduction to statistical methods will be included.

*25-12 Experimental Psychology I*—The Psychology of Learning. An experimental study of the learning process. The laboratory work will center around the conditions which affect learning. Examples of such conditions are the effect of drugs, the relation of learning to length of lesson, amount and difficulty of material, and the mode of attack. Laboratory reports are required.

*25-13 Experimental Psychology II*—The Perceptual Process. Attention, association, thinking and feeling are investigated experimentally. The primary purpose of the experiments is to acquaint the student with procedures and techniques involved in the study of the above concepts. Laboratory reports are required.

*25-14 Experimental Psychology III*—The Senses. The structure and function of the senses, the nature of adequate stimuli, and the laboratory techniques for studying the sensory processes are the chief topics. Laboratory reports are required.

*25-15 Educational Psychology I*—This course will be approached from the professional educator's point of view. The principles of behavior and the physical and motor, emotional, social, mental and intellectual development will be discussed. Such information will be oriented to education and to the principles of learning. It will deal with the implication of psychology for both.

*25-16 Educational Psychology II*—This course will emphasize the psychology of motivation. Attention will be given to educational problems. The effects of social demands, family pressures, economic factors, emotionality, school demands, variations in intelligence, etc., will be related to the process of education and learning. Testing, the control of learning, teacher-pupil relationships, and problems of mental hygiene will be considered. Some case material will be presented from time to time.

*25-17 Measurements I*—Intelligence Testing. In addition to regular classwork, the student will be supervised in the administration of individual intelligence tests such as the Stanford-Binet and the Wechsler Bellevue.

*25-18 Measurements II*—Personality Tests. The course will give the student training in the administration and interpretation of selected personality tests.

*25-19 Measurements III*—Trade and Aptitude Tests. The student will receive practical training in the administration, scoring and interpretation of tests used in vocational and educational guidance.

*25-29 Psychology of Personality*—Emphasis will be placed on the biological and social factors involved in the development of personality.

*25-31 Abnormal Psychology I*—A detailed account of the minor personality disturbances and social maladjustments. A review of the principal conceptions of personality development and disintegration. An evaluation of the typical objective measures of normal and abnormal personalities. The causation and structure of the psychoneuroses. The causes, diagnosis, treatment and prevention of various types of mental disorders.

*25-32 Abnormal Psychology II*—The development of the subject from the minor manifestations of the hypnagogic state, through dreams, hypnotism, hysteria and multiple personality to the more widely divergent conditions appearing in some forms of insanity. The symptomatology of mental disorders; ancient and modern ideas of causation; a critical evaluation of the psychological conceptions underlying diagnosis, therapy, and custodial care. Mental hygiene. Supplementary lectures on amentia, religious and mystical experiences, extrasensory perception, occult phenomena.

*25-33 Social Psychology*—A study of the psychological factors underlying human relations with emphasis upon social motivation, nature and development of groups, social movements and institutions, antisocial behavior, social controls, leadership, co-operation, war, propaganda, racial prejudice.

In addition, the course seeks to elucidate the methods and the techniques which yield trustworthy data regarding social phenomena.

*25-34 Child Psychology*—A survey of the growth and development of children. The course studies the biological, organic, cultural, and psychological determinants of personality structure and development; the

child's conception of the world; the problems of adolescence; the mental and physical characteristics of exceptional children; and the causes of malbehavior.

Special attention is given to the treatment of problem children through a change or modification of the environment, institutional care, and the application of psychological techniques.

*25-35 Industrial Psychology*—A study of the principles and techniques of psychology in their relation to the problems which affect industrial efficiency. The course includes such topics as training and transfer, fatigue, monotony, motivation, accident prevention, conditions and methods of work, vocational fitness, adjustment, and the techniques of human control.

Special consideration is given to the motives controlling owner and manager of industry and that of the employees; to the conflicts of desire which result; to the emotional appeals which are used to resolve these conflicts; and to the unconscious impulses which are rationalized in idealistic and philosophical formulations.

*25-36 Industrial Psychology*—A continuation of 25-35.

*25-41 Advanced Psychology I*—The historical background of modern psychology in the light of philosophical, biological, and general scientific antecedents. A critical survey of the experimental and theoretical literature under the heading of learning and memory, thinking and reasoning, work and fatigue, physiological and genetic psychology, feeling and emotion. Psychophysiological techniques for the study of processes involved in sensory and perceptual experiences. Comparative psychology. Biopsychology. Psychometric techniques.

*25-42 Advanced Psychology II*—A critical survey of the various schools, systems, or points of view in modern psychology. A study and critical evaluation of developments in contemporary psychological theory and of articles in current psychological periodicals.

*25-61 Directed Study*—May be elected with the consent of the department by qualified seniors majoring in psychology.

*25-62 Directed Study*—A continuation of 25-61.

*25-71 Seminar*—Required of juniors majoring in psychology.

*25-72 Seminar*—A continuation of 25-71.

*25-73 Seminar*—Required of seniors majoring in psychology.

*25-74 Seminar*—A continuation of 25-73.

## *Sociology*

*26-01 Principles of Sociology*—In presenting a survey of the origins and sources of human society, this study provides orientation for the courses in principles and problems which follow. The several theories of organic evolution are discussed. The antiquity of man and basic anthropological data are considered. The racial and ethnic groupings of man are then studied in the light of biological, geographical, and cultural factors.

*26-02 Principles of Sociology*—Facts and principles basic to a general knowledge of the field of sociology are presented. The origins, forms, and forces of human associations are discussed. Consideration is given the several leading schools of sociological thought. The course is designed to meet the needs of the student who desires only an elementary survey of the subject as well as the student who plans to take advanced courses in social science.

*26-11 Social Problems*—Attention is given the nature, complex causation, and interrelatedness of social problems in general. Cultural change, with its attendant lags, as well as other social forces and conflicts are studied. While sociological theory is occasionally introduced to clarify the problem at hand, the course is essentially practical in character. Such problems as poverty and unemployment, race antagonisms, population pressures, and the broken home are considered. Optional field trips to various institutions give concreteness to the problems studied.

*26-12 Social Problems*—Similar to 26-11 in background and approach, this course deals with the maladjustments and ills of human society. Emphasis is given those pathological conditions which exist in relations between the individual and the group. Typical subjects presented include mental defectiveness and disease, alcoholism and drug addiction, suicide, delinquency and crime, and pathologies of domestic relations. The field trips arranged for this course add to the practical knowledge of the social ills which are studied.

*26-13 Social Ethics*—To clarify the meaning of morality in social relations is the aim of this study. Right and wrong conduct is analyzed in the light of the highest values for human society. Moral laws are discussed, and the various systems of ethics are evaluated. Scientific attitudes are encouraged in order that one's moral judgments may be compatible with one's best reflective thought.

*26-14 Social Ethics*—Problems arising from differences in moral standards found in the various social groups will be examined. The question of ethical relativism and determinism will be considered. A selected number of specific problems in social ethics will be discussed.

*26-15 The Family*—The historical development of the family is first traced, after which the course focuses upon the modern family. The monogamic family is contrasted with other types, and such unconventional forms as companionate and trial marriages are evaluated. Then follows an intensive study of family problems. A constructive program is presented for strengthening the family as a basic unit in society.

*26-16 Criminology*—Delinquency and crime are defined and classified, and their causal factors indicated. The various theories as to what makes criminals are dealt with, and a brief history of crime is sketched. Legal and economic aspects of crime are summarized, but the study is mainly sociological. Attention is paid to the prevention and correction of criminal behavior and to dealing with offenders. Local institutions are visited.

*26-17 Urban Sociology*—Upon studying the complex human society found in the various cities of the world, this course then turns to an analysis of the modern American city. Its types, social values, and pathological elements are discussed. Methods of city planning are considered. The belief on the part of some sociologists that democracy is doomed by its cities is examined in the light of typical problems of urban society.

*26-18 Social Progress*—The historical development of the theory of progress, contemporary concepts of social progress, the agents of progress, and the phenomenon of regression are several of the subjects for study.

*26-19 Sociological Theory*—With emphasis upon modern authorities, this course surveys the chief systems of sociological thought and the personalities who have made outstanding contributions to the field. Such leading thinkers as Sumner, Ward, Gumplowicz, Durkheim, and Pareto are studied. The relation of sociological theory to contemporary world movements is stressed.

*26-20 American Social Thought*—Beginning with such early social philosophers as Thomas Jefferson and Thomas Paine, this course deals with the significant contributions to the stream of our national culture. The sociological concepts, forces, and institutions—which have produced what is commonly designated as the American way of life—are analyzed and evaluated.

*26-21 Sociology of Religion*—Religious beliefs, practices, and institutions are examined and evaluated in relation to their effects upon society at large. The great religions of the world are compared in the light of their contributions to the well-being and progress of mankind. The social creeds of the several leading denominations in America are discussed with respect to their attitudes towards race, industry, war, and other social problems. The influences of organized religion upon politics and educational institutions are given attention.

*26-22 Principles of Social Work*—This course is designed to prepare the student for part-time or full-time participation, either on a voluntary or professional basis, in any of the major social service agencies. Methods and techniques are studied, and the practical problems are discussed. Several representatives from the various agencies will give occasional lectures. Field trips are offered.

*26-61 Seminar*—Assigned readings and reports on selected topics. May be elected with the consent of the department by qualified seniors majoring in sociology.

*26-62 Seminar*—A continuation of 26-61.

## *Theses*

A thesis in the College of Liberal Arts is considered to be an essay involving the statement, analysis, and solution of some problem in a

special field. Its purpose is to demonstrate a satisfactory degree of initiative and power of original thought and work on the part of the candidate. A mere resume of existing knowledge in some subject is not acceptable. This, it is true, must usually be made, but in addition thereto the student must show an ability to deal constructively with the data which have been collected and the power to draw significant and reliable conclusions from the investigations. The completed thesis will be examined for acceptance or rejection from the technical viewpoint by the major departments interested and then forwarded to the Secretary of the Faculty. Final approval of the thesis rests with the Dean. When it is accepted, the thesis becomes the property of the college and is not to be printed, published, nor in any other way made public except in such manner as the major department and the Dean shall jointly approve.

Frequently thesis subjects may be chosen on problems arising where the student is employed at co-operative work. Employers are usually glad to consult with the student in the selection of the subject and the subsequent development of the thesis.

When theses are conducted in this manner, it is understood that the employer is not expected by the University to assume any expense of the thesis nor to furnish any supplies or equipment to be used in the development of the thesis other than those which he may consider it advisable and desirable to place at the disposal of the students. The regulations governing the use of laboratories and buildings of the co-operating firms will vary in practically all cases and each student must naturally be governed definitely by the regulations existing at the plant where the thesis is to be conducted.

It is understood that the thesis work must not in any way interfere with the regular required co-operative work and must be done during hours distinctly outside of regular co-operative work hours unless special request is made by the co-operating firm for some other arrangement.

Theses conducted in conjunction with co-operating firms must be submitted in duplicate, one copy to be presented by the Dean to the co-operating employer.

Theses are not required of seniors in the College of Liberal Arts. To certain students who wish to do so, however, the privilege of writing a thesis may be granted by the Faculty Committee on Theses in accordance with the following regulations:

1. To be eligible to write a thesis a student must have attained a scholastic average of at least 2.0 or better through the middler year and the first half of the junior year.

2. Students who have met this minimum requirement may petition for the privilege of substituting a thesis for formal classroom work.

3. In this petition the student must state the subject which is to be investigated and give a brief statement of the purpose and scope of the proposed thesis.

4. Petitions for the privilege of writing theses must be submitted in writing to the head of the student's major department not later than the middle of the second term of the junior year.

# NORTHEASTERN UNIVERSITY

## COLLEGE OF

# BUSINESS ADMINISTRATION

*Admission Requirements and Courses of Study*

1947-1948

(CO-EDUCATIONAL)

BOSTON 15, MASSACHUSETTS
JANUARY, 1947

# THE COLLEGE OF BUSINESS ADMINISTRATION

## *Business and Education*

TODAY as never before "Business" is co-operating with educational institutions in the training of young men and women who are looking forward to positions in business at the administrative level. The need for professionalization in the major fields of business administration became apparent in the "New Deal" thirties and has been strengthened by the requirements of conversion and reconversion. Accountancy has established itself as a profession, and the day is coming when the administrative positions in industrial relations, advertising, marketing, finance, insurance, and general management will offer the prestige of professionalization. The College of Business Administration offers accredited programs of study to meet the educational needs of the young men and women who hope to fill these positions.

Although it is true that collegiate training for business is relatively new in the field of higher education, it is also evident that collegiate business schools are beyond the stage of early experimentation and have emerged on a level with other college courses recognized as higher education. There is a certain advantage in newness in that the mere youth of the college keeps it up to date in its outlook and scope of activity. In addition, it is not bound by the traditional but obsolete practices sometimes found in older branches of education.

We hear a good deal today about the increasing need for specialists in business. It is asserted that modern business institutions have become so large that no one individual can administer the many matters of routine involving executive judgment. The need for specialists is self-evident, but the training best suited for preparing the individual to take over specialized executive authority is not so evident. There are many schools offering a short course of training in preparation for these specialized positions. Such training cannot give the individual the breadth of vision needed to go beyond minor managerial jobs demanding attention to the exhausting details of daily routine.

To pass beyond this on the way to responsibility of truly executive nature a background of general business and related knowledge is essential. This background should precede the specialized study into a particular branch of business, enabling one to see the whole business and industrial picture and not merely one branch of it. Executive administration cannot be taught with any adequacy by attacking one subject, no matter how carefully planned the approach and how thorough the course of study. For instance, accounting is not the only means of arriving at a production budget based on sales estimates; it is but one of the tools. A knowledge of marketing, finance, statistics, and management technique is also needed.

For this reason the academic content of the different curricula in the College of Business Administration is divided roughly as follows: one-eighth in English (writing and speaking), one-third in the social sciences, one-quarter in a special branch of business, and one-quarter in related business subjects. This subject matter content is equivalent to that offered in the traditional four-year undergraduate business curricula. Since, however, periods of probation and apprenticeship are inherent in the nature of positions at the administrative level, the Northeastern programs based upon the co-operative plan are especially significant.

## *Aims of the College*

In keeping with current trends in collegiate business education, the educational policy of the college is directed toward the achievement of the following purposes:

*First:* To offer that type of education for business which will enable men and women to select most advisedly the field of business best suited to their aptitudes. The Co-operative Plan is particularly effective in this respect.

*Second:* To build for breadth of perspective in preference to over-specialization with its narrowing effects. To eliminate haphazard selection of courses, through concentration upon balanced, carefully co-ordinated curricula, in order to provide an adequate background for specialization and yet not overlook professional needs and requirements.

*Third:* To provide a thorough knowledge of fundamental economic laws and an understanding of their applications in business.

*Fourth:* To develop the habits of accurate thinking that are essential to sound judgment.

*Fifth:* To develop attitudes and ideals that are ethically sound and socially desirable.

## *Methods*

In order that these aims may be realized as fully as possible, the college makes use of the problem and the case methods of instruction in addition to the lecture and recitation system. Textbook reading alone is almost valueless; students tend to accept without question what the textbook presents. Instead, they should learn to analyze every proposition, to challenge unsupported assertions, to think independently, and to support their thinking with logic and facts.

Hence, concrete problems and cases which executives have faced in accounting, marketing, organizing, and the like constitute the bulk of classwork. Students analyze problems, break them into their constituent parts, discover and list the factors for and against possible solutions, and work out a logical conclusion. In class they discuss their work with their instructors in the light of the latter's broader knowledge.

Such a method tends to develop an executive attitude. No lecture or mere reading of textbooks can do so. Students gain skill and facility in solving problems by actually solving many hundreds of them, thereby

accumulating a ripe experience seldom open to the employee buried in routine and mechanical detail. What counts in business, as elsewhere, is not solely whether one possesses much knowledge, but whether through his knowledge one can logically and effectively solve the problems he confronts, or possibly prevent problems from arising. Experience in solving typical problems provides a background for anticipating and forestalling similar ones as well as for solving others that may arise.

The methods of Northeastern for accomplishing its aims are not limited to the work of the classroom. Northeastern places great emphasis upon the power of co-operative work. During the co-op work periods students obtain the basic experience and the practical know-how that gives them some standing in the field of their choice. Also as a part of its methods, Northeastern offers a broad program of student activities, and every student is encouraged to participate. The personal growth that comes from participation in athletics, musical clubs, class affairs, professional societies, etc., is an asset to every student who aspires to business leadership.

## *Equipment*

*Visual Education Equipment*—Classroom instruction is made more effective by the use of motion pictures and lantern slides. For this purpose there are available projectors for 16 mm. and 35 mm. films. Complete sound motion picture apparatus is also available. New and powerful Delineascopes project the lantern slides. Stationary as well as portable daylight screens enable students to take notes while viewing the pictures.

*Business Laboratory*—Students have available for laboratory work in accounting and statistical methods all of the commonly used office machines. These are available in a special room together with necessary library services, including Moody's Manuals, Poor's Manuals, and various charts and maps.

The laboratory is in charge of a graduate assistant whose work is to maintain the equipment in excellent condition and to give instruction in the use of the various office machines.

Principal pieces of equipment in the laboratory include duplicators, typewriters, hand and electric calculators, and both hand and electric adding machines.

# Admission Requirements

Applicants for admission to the freshman class without restrictions must qualify by one of the following methods:

1. Graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed below.

2. Completion of fifteen acceptable secondary school units with a degree of proficiency satisfactory to the Department of Admissions.

3. Examinations.

Applicants whose secondary school records are satisfactory are not required to take entrance examinations in high school subjects, but all candidates for the freshman class are asked to come to Northeastern University to take scholastic aptitude tests.

## *Prescribed Subjects for Admission*

*College of Business Administration*

| | |
|---|---|
| Algebra | 1 unit |
| Natural science | 1 unit |
| Science, social studies, mathematics and/or foreign language | 6 units |
| English (four years) | 3 units |
| Electives | 4 units |
| Total | 15 units |

A unit is a credit given to an acceptable secondary school course which meets at least four times a week for periods of not less than forty minutes each throughout the school year.

The Committee on Admissions reserves the right to require a candidate to be present for an examination in any subjects that it may deem necessary because of some weakness in the secondary school record.

## *Other Requirements*

These formal requirements are necessary and desirable in that they tend to provide all entering students with a common ground upon which the first year of the college curriculum can be based. But academic credits alone are not an adequate indication of a student's ability to profit by a college education. Consequently, the Department of Admissions takes into consideration, along with the formal requirements stated above, other factors regarding candidates for the freshman class. A student's interests and aptitudes in so far as these can be determined, capacity for hard work, attitude toward classmates and teachers in high school, physical stamina, and most important of all, character, are considered. In this way the University seeks to select for its student body those who not only meet the academic admission requirements but who also give

promise of acquitting themselves creditably in the rigorous program of training afforded by the Co-operative Plan and of being useful members of society.

### *Personal Interview*

A personal interview is always preferred to correspondence, and parents are urged to accompany the applicant whenever this is possible. Effective guidance depends in large measure upon a complete knowledge of a student's background and problems. Parents invariably are able to contribute information that aids the admissions officer in arriving at a decision.

Candidates should visit the Office of Admissions for personal interview if it is possible for them to do so before submitting their applications. Office hours are from 9:00 A.M. to 4:00 P.M. daily; Saturdays to 12:00 M. The Department of Admissions will interview applicants on Wednesday evenings but by appointment only.

### *Application for Admission*

Each applicant for admission is required to fill out an application blank stating previous education, as well as the names of persons to whom reference may be made.

A fee of five dollars ($5.00) is required when the application is filed. This fee is nonreturnable.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five-dollar fee to the Director of Admissions, Northeastern University, Boston 15, Massachusetts.

Checks should be made out to Northeastern University.

Upon receipt of the application, properly filled out, the University secures the references and secondary school record. As soon as possible after the Committee on Admissions has reviewed the completed application, a report of the status with respect to admission will be sent to each candidate.

Early filing of applications is recommended.

The University reserves the right to place any entering student upon an indefinite trial period. Reclassification will be determined upon the academic success of the student.

### *Registration*

Eligibility for admission does not constitute registration. Freshmen will register at the University on Thursday, September 4, 1947, and Thursday, November 13, 1947. Students are not considered to have met the requirements for admission until they have successfully passed the required physical examination.

### *Advanced Standing*

Students transferring from approved colleges will be admitted to advanced standing provided their records warrant it. Whenever a person enters with advanced standing and later proves to have had inadequate

preparation in any prerequisite subjects, the faculty reserves the right to require the student to make up such deficiencies.

Applicants seeking advanced standing should arrange to have transcripts of their previous college records forwarded with their initial inquiry. Students admitted to advanced standing are not eligible for placement for co-operative work until they have completed a full year of academic work at the University.

# Requirements for Graduation

Students may qualify for the degree of Bachelor of Science in Business Administration in one of the following options: Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management.

Candidates for the Bachelor of Science degree must complete all of the prescribed work of the curriculum in which they seek to qualify with a degree of proficiency acceptable to the faculty. Students who undertake co-operative work assignments must also meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

Students transferring from another college or university are not eligible to receive the B.S. degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

## *Scholarship Requirements*

Students who fail to show satisfactory standards of general efficiency in their professional fields may be required to demonstrate their qualifications for the degree by taking such additional work as the faculty may prescribe. Those who are clearly unable to meet the accepted standard of attainment may be required to withdraw from the University. The degree conferred not only represents the formal completion of the subjects in the selected course of study but also indicates professional competence in the designated field of business administration.

## *Graduation with Honor*

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

## *Thesis Option*

Theses are not required of candidates for the degree of Bachelor of Science in Business Administration. Students who show special aptitude for thesis work, however, may be permitted to substitute an appropriate thesis for equivalent work in class. Such permission must be obtained by the candidate from the Dean of the college.

# The Programs of Study

## First Year

A full year of thirty weeks is devoted to a survey of the economic, political, and social institutions that underlie the conduct of business.

The basic tool of business, the keeping of accounts, is introduced during the first year to provide a practical check upon the interest and capacity of each student in the College of Business Administration.

English is given an important place and other courses fill the personal needs of the student and prepare him for the more advanced work. Throughout the year each student has the friendly counsel and guidance of a faculty adviser whose aim is to help bridge the gap between high school and college.

## Upperclass Years

For those who elect the five-year Co-operative Plan, training on the job starts with the second year.

At the end of the second year, at the close of term 6, students elect their curricular options in accordance with their major fields of interest and natural aptitudes.

In each of terms 11, 12, 14, and 15 each student will elect a 4-credits course from a group of selected courses. A student may, for instance, elect to take a series of courses in a language or to take advanced courses in economics, history, government, sociology, psychology, or to take particular courses in other fields of study. The list of elective subjects for each term will be somewhat limited by schedule conflicts with the prescribed program of study but as wide a selection as practicable will be offered.

During the last year all students attend a series of meetings designed to prepare them for entrance into the business world. Under expert guidance each student prepares a complete personnel record, studies himself and the opportunities that are open to him, and generally establishes himself for his "commencement."

## The Professional Options

All students are required to take common courses which are deemed necessary for a well-rounded training. These are pursued jointly with the professional work which has been selected, with a view to meeting the changing and expanding needs of present-day business conduct, while at the same time meeting the vocational needs of the students by way of earning a living. A brief statement of the vocational opportunities in the fields of work represented by each of the professional options follows:

*I. Accounting*—Many successful careers are open to the professional accountants. Their services are demanded by business, commerce and industry. Public and private enterprises seek adequately trained men and women. Better known among the wide variety of titles descriptive

of their work are public and private accountant, cost accountant, resident and traveling auditor, credit manager, statistician, investigator, adjuster, and financial accountant.

*II. Industrial Relations*—The day is past when "anyone" can direct labor-management relations. A host of opportunities exist, therefore, in this newer field, the human side of conducting a business. Both unions and management offer a wide selection of positions in personnel, bargaining, wage administration and public relations. The government, too, has many openings for men and women who have taken this program of studies.

*III. Marketing and Advertising*—Business and industry must sell their services and products to each other and to the general public. Successful selling means more than being a salesman. It demands knowledge of distribution channels, markets and buying habits, as well as sales resistance. It means also knowing how to buy in order to sell and then how to organize, promote, and carry out a sales campaign.

The following list is representative of the vast array of marketing and advertising occupations: sales manager, supervisor, analyst and correspondent, advertising manager, promotion manager, copy supervisor, space buyer, and publicity director; market, product and sales analyst, industrial salesman, sales personnel supervisor, field representative, missionary salesman, manufacturer's agent, merchandise manager, and retail store operator.

*IV. Finance and Insurance*—Financial institutions serving present-day business and industry are its life stream. Any list of these organizations which are indispensable in the conduct of business must include banks, insurance companies, investment houses, credit concerns, financial exchanges, business forecasting organizations, financial service institutions, mortgage companies, national and local real estate brokerage firms, and appraisers.

Specific courses offered in Northeastern University's College of Business Administration open the door to a host of careers in these institutions as well as the many governmental regulatory agencies controlling their operations.

*V. Business Management*—This curriculum might be called the basic program of the College of Business Administration. Graduates in Business Management find posts in small business, big business, and public service.

Here is the field of training for the person whose ambition is to start a business of his own.

Here is the field of training for the person who is thinking in terms of production control, planning, methods analysis, purchasing, traffic control, or other supervisory and executive work.

Here is the field of training for the person who is keenly aware of the possibilities in public administration. Increased use of city-management

plans and increased number and prestige of civil service careers present a wide group of opportunities to graduates of this program.

### *Prelegal Curriculum*

Effective September 1, 1938, by a ruling of the Supreme Judicial Court of Massachusetts, in order to be eligible for examination for admission to the bar, an applicant must have completed certain general educational requirements before beginning his legal education. Briefly, this general education must comprise graduation from a four-year high school and the completion of not less than half of the work accepted for the Bachelor's degree in a college approved by the Board of Bar Examiners.

Recognizing that business training furnishes an excellent background for prelegal training, the College of Business Administration offers a prelegal curriculum. This consists of taking an amount of work in the college equivalent to that required for admission to specific law schools in the Commonwealth, and usually requires residence in school for sixty-five weeks of instruction.

### *Combined Program*
### *Business Administration and Law*

The combined curriculum in the College of Business Administration and the School of Law enables students to reduce by one year the time ordinarily required for obtaining the B.S. in Business Administration and the LL.B. degrees. Students who have completed before entering the School of Law at least 175 Northeastern credits of academic work of which at least 120 must have been earned in the Northeastern University College of Business Administration, and who have fulfilled all other graduation requirements, will receive the B.S. degree in Business Administration upon the satisfactory completion of the full first year program in the Day Division of the School of Law. Students who enter the Evening Division of the School of Law will be eligible for the first degree upon satisfactory completion of the full equivalent of the first year of the day Law School program.

In both instances the first degree will be conferred at the next Commencement following determination of eligibility for the first degree.

# *Curriculum in Accounting (41)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 20-01 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-02 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-03 | Econ. Geog. | 3 | 0 | 6 | 3 |
| 22-01 | Am. Govt. | 3 | 0 | 6 | 3 | 22-02 | Am. Govt. | 3 | 0 | 6 | 3 | 22-03 | Am. Govt. | 3 | 0 | 6 | 3 |
| 41-01 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-02 | Prin. of Acct. | 2 | 2 | 8 | 4 | 41-03 | Prin. of Acct. | 2 | 2 | 8 | 4 |
| 23-01 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civil. | 4 | 0 | 8 | 4 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-04 | English | 5 | 0 | 10 | 2½ | 43-01 | Prin. Mktg. | 3 | 0 | 6 | 3 | 43-02 | Prin. Advt. | 3 | 0 | 6 | 3 |
| 12-05 | Graph. Pres. | 3 | 6 | 9 | 3 | 44-01 | Prin. Bkg. | 3 | 0 | 6 | 3 | 44-02 | Prin. Ins. | 3 | 0 | 6 | 3 |
| 23-04 | Hist. Civil. | 4 | 0 | 8 | 2 | 30-05 | Public Spkg. | 4 | 0 | 5 | 3 | 30-06 | Public Spkg. | 4 | 0 | 5 | 3 |
| | | | | | | 41-04 | Inter. Acctg. | 2 | 2 | 8 | 4 | 41-05 | Inter. Acctg. | 2 | 2 | 8 | 4 |
| | | | | | | 25-01 | Intro. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen'l Psych. | 4 | 0 | 8 | 4 |
| | | 12 | 6 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-13 | Prin. Econ. | 8 | 0 | 16 | 4 | 20-14 | Econ. Probs. | 4 | 0 | 8 | 4 | 20-15 | Econ. Probs. | 4 | 0 | 8 | 4 |
| 46-01 | Bus. Law I (Contracts) | 8 | 0 | 13 | 3½ | 44-11 | Bus. Fin. | 4 | 0 | 8 | 4 | 44-12 | Bus. Fin. | 4 | 0 | 8 | 4 |
| | | | | | | 45-01 | In. Mgt. | 4 | 0 | 8 | 4 | 45-02 | Ind. Mgt. | 4 | 0 | 8 | 4 |
| | | | | | | 41-11 | Cost Acctg. | 3 | 3 | 9 | 5 | 41-12 | Cost Acctg. | 3 | 3 | 9 | 5 |
| | | 16 | 0 | 29 | 7½ | | | 15 | 3 | 33 | 17 | | | 15 | 3 | 33 | 17 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-02 | Bus. Law II (Neg. Instr.) | 9 | 0 | 15 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| | | | | | | 20-18 | Am.Ec.Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ.II | 4 | 0 | 8 | 4 |
| 41-21 | Prob. in Ac. | 5 | 5 | 11 | 3½ | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 | 45-04 | Bus. Mach. | 0 | 3 | 0 | 1 |
| | | | | | | 41-15 | Trust Acctg. | 2 | 4 | 6 | 4 | 41-22 | Acctg. Prob. | 2 | 4 | 6 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 5 | 26 | 7½ | | | 13 | 9 | 29 | 17 | | | 13 | 9 | 29 | 17 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-08 | Bus. Comm. | 5 | 4 | 9 | 3 | 45-31 | Bus. & Gov. | 4 | 0 | 8 | 4 | 45-32 | Bus. Pol. | 4 | 0 | 8 | 4 |
| 20-27 | Int. Ec. Rel. | 3 | 0 | 6 | 1½ | 46-11 | Bus. Law III (Per. Prop. & Sales) | 3 | 0 | 6 | 3 | 46-12 | Bus. Law IV (Agency) | 3 | 0 | 6 | 3 |
| 41-23 | Acctg. Prob. | 0 | 9 | 9 | 3 | 41-24 | C.P.A. Prob. | 2 | 2 | 5 | 3 | 41-25 | C.P.A. Prob. | 2 | 2 | 5 | 3 |
| | | | | | | 46-21 | Inc.Tax Law | 2 | 2 | 5 | 3 | 41-26 | Auditing | 2 | 2 | 5 | 3 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 8 | 13 | 24 | 7½ | | | 15 | 4 | 32 | 17 | | | 15 | 4 | 32 | 17 |

*Summer term — 5 weeks.

# *Curriculum in Industrial Relations (42)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Course | Cl. | Lab. | Pr. | Cr. | No. | Course | Cl. | Lab. | Pr. | Cr. | No. | Course | Cl. | Lab. | Pr. | Cr. |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 20-01 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-02 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-03 | Econ. Geog. | 3 | 0 | 6 | 3 |
| 22-01 | Am. Govt. | 3 | 0 | 6 | 3 | 22-02 | Am. Govt. | 3 | 0 | 6 | 3 | 22-03 | Am. Govt. | 3 | 0 | 6 | 3 |
| 41-01 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-02 | Prin of Acct. | 2 | 2 | 8 | 4 | 41-03 | Prin. of Acct. | 2 | 2 | 8 | 4 |
| 23-01 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civil. | 4 | 0 | 8 | 4 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-04 | English | 5 | 0 | 10 | 2½ | 43-01 | Prin. Mktg. | 3 | 0 | 6 | 3 | 43-02 | Prin. Advt. | 3 | 0 | 6 | 3 |
| 12-05 | Graph. Pres. | 3 | 6 | 9 | 3 | 44-01 | Prin. Bkg. | 3 | 0 | 6 | 3 | 44-02 | Prin. Ins. | 3 | 0 | 6 | 3 |
| 23-04 | Hist. Civil. | 4 | 0 | 8 | 2 | 30-05 | Public Spkg. | 4 | 0 | 5 | 3 | 30-06 | Public Spkg. | 4 | 0 | 5 | 3 |
| | | | | | | 41-04 | Inter. Acctg. | 2 | 2 | 8 | 4 | 41-05 | Inter. Acctg. | 2 | 2 | 8 | 4 |
| | | | | | | 25-01 | Intro. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen'l Psych. | 4 | 0 | 8 | 4 |
| | | 12 | 6 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-13 | Prin. Econ. | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| 46-01 | Bus. Law I | 8 | 0 | 13 | 3½ | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-02 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | | | | | | 45-01 | In. Mgt. | 4 | 0 | 8 | 4 | 45-02 | In. Mgt. | 4 | 0 | 8 | 4 |
| | | | | | | 41-11 | Cost Acctg. | 3 | 3 | 9 | 5 | 41-12 | Cost Acctg. | 3 | 3 | 9 | 5 |
| | | 16 | 0 | 29 | 7½ | | | 15 | 3 | 33 | 17 | | | 15 | 3 | 33 | 17 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-02 | Bus. Law II | 9 | 0 | 15 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| 42-16 | Testing | 5 | 5 | 11 | 3½ | 20-18 | Am.Ec.Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ. | 4 | 0 | 8 | 4 |
| | | | | | | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 | 45-04 | Bus. Mach. | 0 | 3 | 0 | 1 |
| | | | | | | 42-11 | Pers. Adm. | 4 | 0 | 8 | 4 | 42-12 | Pers. Admin. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 5 | 26 | 7½ | | | 15 | 5 | 31 | 17 | | | 15 | 5 | 31 | 17 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-08 | Bus. Comm. | 5 | 4 | 9 | 3 | 45-31 | Bus. & Gov. | 4 | 0 | 8 | 4 | 45-32 | Bus. Pol. | 4 | 0 | 8 | 4 |
| 20-27 | Int. Ec. Rel. | 3 | 0 | 6 | 1½ | 25-23 | Ind. Psych. | 3 | 0 | 6 | 3 | 25-24 | Ind. Psych. | 3 | 0 | 6 | 3 |
| 42-20 | Prod. Proc. | 6 | 0 | 12 | 3 | 42-13 | Wage Adm. | 2 | 2 | 5 | 3 | 42-14 | Wage Adm. | 2 | 2 | 5 | 3 |
| | | | | | | 42-22 | I.R. Seminar | 2 | 2 | 5 | 3 | 42-23 | I.R. Seminar | 2 | 2 | 5 | 3 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 4 | 27 | 7½ | | | 15 | 4 | 32 | 17 | | | 15 | 4 | 32 | 17 |

*Summer term — 5 weeks.

## *Curriculum in Marketing and Advertising (43)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 20-01 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-02 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-03 | Econ. Geog. | 3 | 0 | 6 | 3 |
| 22-01 | Am. Govt. | 3 | 0 | 6 | 3 | 22-02 | Am. Govt. | 3 | 0 | 6 | 3 | 22-03 | Am. Govt. | 3 | 0 | 6 | 3 |
| 41-01 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-02 | Prin.of Acct. | 2 | 2 | 8 | 4 | 41-03 | Prin. of Acct. | 2 | 2 | 8 | 4 |
| 23-01 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civil. | 4 | 0 | 8 | 4 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-04 | English | 5 | 0 | 10 | 2½ | 43-01 | Prin. Mktg. | 3 | 0 | 6 | 3 | 43-02 | Prin. Advt. | 3 | 0 | 6 | 3 |
| 12-05 | Graph. Pres. | 3 | 6 | 9 | 3 | 44-01 | Prin. Bkg. | 3 | 0 | 6 | 3 | 44-02 | Prin. Ins. | 3 | 0 | 6 | 3 |
| 23-04 | Hist. Civil. | 4 | 0 | 8 | 2 | 30-05 | Pub. Spkg. | 4 | 0 | 5 | 3 | 30-06 | Pub. Spkg. | 4 | 0 | 5 | 3 |
| | | | | | | 41-04 | Inter. Acct. | 2 | 2 | 8 | 4 | 41-05 | Inter. Acct. | 2 | 2 | 8 | 4 |
| | | | | | | 25-01 | Intro. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen'l Psych. | 4 | 0 | 8 | 4 |
| | | 12 | 6 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-13 | Prin. Econ. | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| 46-01 | Bus. Law I | 8 | 0 | 13 | 3½ | 26-01 | Prin. Soc. | 4 | 0 | 8 | 4 | 26-02 | Prin. Soc. | 4 | 0 | 8 | 4 |
| | | | | | | 45-01 | Ind. Mgt. | 4 | 0 | 8 | 4 | 45-02 | Ind. Mgt. | 4 | 0 | 8 | 4 |
| | | | | | | 43-11 | Sales Mgt. | 3 | 3 | 9 | 5 | 43-12 | Sales Mgt. | 3 | 3 | 9 | 5 |
| | | 16 | 0 | 29 | 7½ | | | 15 | 3 | 33 | 17 | | | 15 | 3 | 33 | 17 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-02 | Bus. Law II | 9 | 0 | 15 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| 43-10 | Conf.Ldrship | 5 | 5 | 11 | 3½ | 20-18 | Am.Ec.Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ. | 4 | 0 | 8 | 4 |
| | | | | | | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 |
| | | | | | | 43-13 | Probs. Advt. Mkt. | 0 | 6 | 6 | 4 | 43-14 | Probs. Advt. Mkt. | 0 | 6 | 6 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 5 | 26 | 7½ | | | 11 | 11 | 29 | 17 | | | 11 | 11 | 29 | 17 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-08 | Bus. Comm. | 5 | 4 | 9 | 3 | 45-31 | Bus. & Gov. | 4 | 0 | 8 | 4 | 45-32 | Bus. Pol. | 4 | 0 | 8 | 4 |
| 20-27 | Int. Ec. Rel. | 3 | 0 | 6 | 1½ | 46-11 | Bus. Law III | 3 | 0 | 6 | 3 | 43-22 | Mdsg. | 4 | 4 | 10 | 6 |
| 43-15 | Adv. Prob. Mkt.,Advt. | 0 | 9 | 9 | 3 | 43-21 | Mdsg. | 2 | 2 | 5 | 3 | 43-24 | Mkt. Rsch. | 3 | 0 | 6 | 3 |
| | | | | | | 43-23 | Store Mgt. | 2 | 2 | 5 | 3 | | Elective | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | | | | | |
| | | 8 | 13 | 24 | 7½ | | | 15 | 4 | 32 | 17 | | | 15 | 4 | 32 | 17 |

*Summer term — 5 weeks.

## *Curriculum in Finance and Insurance (44)*

### FIRST YEAR

| Term 1 | | | | | | Term 2 | | | | | | Term 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 20-01 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-02 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-03 | Econ. Geog. | 3 | 0 | 6 | 3 |
| 22-01 | Am. Govt. | 3 | 0 | 6 | 3 | 22-02 | Am. Govt. | 3 | 0 | 6 | 3 | 22-03 | Am. Govt. | 3 | 0 | 6 | 3 |
| 41-01 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-02 | Prin. of Ac. | 2 | 2 | 8 | 4 | 41-03 | Prin. of Acct. | 2 | 2 | 8 | 4 |
| 23-01 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civil. | 4 | 0 | 8 | 4 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 |

### SECOND YEAR

| Term 4* | | | | | | Term 5 | | | | | | Term 6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-04 | English | 5 | 0 | 10 | 2½ | 43-01 | Prin. Mktg. | 3 | 0 | 6 | 3 | 43-02 | Prin. Advt. | 3 | 0 | 6 | 3 |
| 12-05 | Graph. Pres. | 3 | 6 | 9 | 3 | 44-01 | Prin. Bkg. | 3 | 0 | 6 | 3 | 44-02 | Prin. Ins. | 3 | 0 | 6 | 3 |
| 23-04 | Hist. Civil. | 4 | 0 | 8 | 2 | 30-05 | Public Spkg. | 4 | 0 | 5 | 3 | 30-06 | Pub. Spkg. | 4 | 0 | 5 | 3 |
| | | | | | | 41-04 | Inter. Acct. | 2 | 2 | 8 | 4 | 41-05 | Inter. Acct. | 2 | 2 | 8 | 4 |
| | | | | | | 25-01 | Intro.Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen'l Psych. | 4 | 0 | 8 | 4 |
| | | 12 | 6 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

### THIRD YEAR

| Term 7* | | | | | | Term 8 | | | | | | Term 9 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-13 | Prin. Econ. | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| 46-01 | Bus. Law I | 8 | 0 | 13 | 3½ | 44-11 | Bus. Fin. | 4 | 0 | 8 | 4 | 44-12 | Bus. Fin. | 4 | 0 | 8 | 4 |
| | | | | | | 45-01 | In. Mgt. | 4 | 0 | 8 | 4 | 45-02 | Ind. Mgt. | 4 | 0 | 8 | 4 |
| | | | | | | 41-11 | Cost Acctg. | 3 | 3 | 9 | 5 | 41-12 | Cost Acctg. | 3 | 3 | 9 | 5 |
| | | 16 | 0 | 29 | 7½ | | | 15 | 3 | 33 | 17 | | | 15 | 3 | 33 | 17 |

### FOURTH YEAR

| Term 10* | | | | | | Term 11 | | | | | | Term 12 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-02 | Bus. Law II | 9 | 0 | 15 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| 43-10 | Conf.Ldrship | 5 | 5 | 11 | 3½ | 20-18 | Am.Ec.Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ. | 4 | 0 | 8 | 4 |
| | | | | | | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 | 45-04 | Bus. Mach. | 0 | 3 | 0 | 1 |
| | | | | | | 41-15 | Trust Acctg. | 4 | 0 | 8 | 4 | 14-25 | Math. of Fin. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 6 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 5 | 26 | 7½ | | | 15 | 5 | 29 | 17 | | | 15 | 5 | 31 | 17 |

### FIFTH YEAR

| Term 13* | | | | | | Term 14 | | | | | | Term 15 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-08 | Bus. Comm. | 5 | 4 | 9 | 3 | 45-31 | Bus. & Gov. | 4 | 0 | 8 | 4 | 45-32 | Bus. Pol. | 4 | 0 | 8 | 4 |
| 20-27 | Int. Ec. Rel. | 3 | 0 | 6 | 1½ | 46-11 | Bus. Law III | 3 | 0 | 6 | 3 | 46-12 | Bus. Law IV | 3 | 0 | 6 | 3 |
| 44-21 | Real Estate | 6 | 0 | 12 | 3 | 44-22 | Investments | 2 | 2 | 5 | 3 | 44-23 | Investments | 2 | 2 | 5 | 3 |
| | | | | | | 46-21 | In. Tax Law | 2 | 2 | 5 | 3 | 44-24 | Pbs. Fin. Ins. | 2 | 2 | 5 | 3 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 4 | 27 | 7½ | | | 15 | 4 | 32 | 17 | | | 15 | 4 | 32 | 17 |

*Summer term — 5 weeks.

# *Curriculum in Business Management (45)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 20-01 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-02 | Econ. Geog. | 3 | 0 | 6 | 3 | 20-03 | Econ. Geog. | 3 | 0 | 6 | 3 |
| 22-01 | Am. Govt. | 3 | 0 | 6 | 3 | 22-02 | Am. Govt. | 3 | 0 | 6 | 3 | 22-03 | Am. Govt. | 3 | 0 | 6 | 3 |
| 41-01 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-02 | Int. to Acct. | 2 | 2 | 8 | 4 | 41-03 | Int. to Acct. | 2 | 2 | 8 | 4 |
| 23-01 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-02 | Hist. Civil. | 3 | 0 | 6 | 3 | 23-03 | Hist. Civil. | 4 | 0 | 8 | 4 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 | | | 15 | 4 | 34 | 17 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-04 | English | 5 | 0 | 10 | 2½ | 43-01 | Prin. Mktg. | 3 | 0 | 6 | 3 | 43-02 | Prin. Advt. | 3 | 0 | 6 | 3 |
| 12-05 | Graph. Pres. | 3 | 6 | 9 | 3 | 44-01 | Prin. Bkg. | 3 | 0 | 6 | 3 | 44-02 | Prin. Ins. | 3 | 0 | 6 | 3 |
| 23-04 | Hist. Civil. | 4 | 0 | 8 | 2 | 30-05 | Public Spkg. | 4 | 0 | 5 | 3 | 30-06 | Public Spkg. | 4 | 0 | 5 | 3 |
| | | | | | | 41-04 | Inter. Acct. | 2 | 2 | 8 | 4 | 41-05 | Inter. Acct. | 2 | 2 | 8 | 4 |
| | | | | | | 25-01 | Intro. Psych. | 4 | 0 | 8 | 4 | 25-02 | Gen'l Psych. | 4 | 0 | 8 | 4 |
| | | 12 | 6 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-13 | Prin. Econ. | 8 | 0 | 16 | 4 | 20-14 | Econ. Prob. | 4 | 0 | 8 | 4 | 20-15 | Econ. Prob. | 4 | 0 | 8 | 4 |
| 46-01 | Bus. Law I | 8 | 0 | 13 | 3½ | 44-11 | Bus. Fin. | 4 | 0 | 8 | 4 | 44-12 | Bus. Fin. | 4 | 0 | 8 | 4 |
| | | | | | | 45-01 | In. Mgt. | 4 | 0 | 8 | 4 | 45-02 | Ind. Mgt. | 4 | 0 | 8 | 4 |
| | | | | | | 41-11 | Cost Acct. | 3 | 3 | 9 | 5 | 41-12 | Cost Acct. | 3 | 3 | 9 | 5 |
| | | 16 | 0 | 29 | 7½ | | | 15 | 3 | 33 | 17 | | | 15 | 3 | 33 | 17 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-02 | Bus. Law II | 9 | 0 | 15 | 4 | 20-20 | Statistics | 3 | 2 | 7 | 4 | 20-21 | Statistics | 3 | 2 | 7 | 4 |
| 43-10 | Conf. Ldrship | 5 | 5 | 11 | 3½ | 20-18 | Am. Ec. Hist. | 4 | 0 | 8 | 4 | 20-26 | Labor Econ. | 4 | 0 | 8 | 4 |
| | | | | | | 45-03 | Bus. Mach. | 0 | 3 | 0 | 1 | 45-04 | Bus. Mach. | 0 | 3 | 0 | 1 |
| | | | | | | 42-11 | Pers. Adm. | 4 | 0 | 8 | 4 | 42-12 | Pers. Admin. | 4 | 0 | 8 | 4 |
| | | | | | | | Elective | 4 | 0 | 8 | 4 | | Elective | 4 | 0 | 8 | 4 |
| | | 14 | 5 | 26 | 7½ | | | 15 | 5 | 31 | 17 | | | 15 | 5 | 31 | 17 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-08 | Bus. Comm. | 5 | 4 | 9 | 3 | 45-31 | Bus. & Gov. | 4 | 0 | 8 | 4 | 45-32 | Bus. Pol. | 4 | 0 | 8 | 4 |
| 20-27 | Int. Ec. Rel. | 3 | 0 | 6 | 1½ | 46-11 | Bus. Law III | 3 | 0 | 6 | 3 | 46-12 | Bus. Law IV | 3 | 0 | 6 | 3 |
| 42-20 | Prod. Proc. | 6 | 0 | 12 | 3 | 45-21 | Pub. Adm. | 4 | 0 | 8 | 4 | 45-22 | Pub. Admin. | 4 | 0 | 8 | 4 |
| | | | | | | 45-23 | Traffic Mgt. | 2 | 2 | 5 | 3 | 45-24 | Adv. Mgt. | 2 | 2 | 5 | 3 |
| | | | | | | | Elective | 3 | 0 | 6 | 3 | | Elective | 3 | 0 | 6 | 3 |
| | | 14 | 4 | 27 | 7½ | | | 16 | 2 | 33 | 17 | | | 16 | 2 | 33 | 17 |

*Summer term — 5 weeks.

# Synopses of Courses of Instruction

On the pages which follow are given the synopses of courses offered in the several curricula of the College of Business Administration. Curricula of the three colleges on either the co-operative or full-time plan comprise 130 weeks of classroom instruction, namely, three ten-week periods in the freshman year and 100 weeks of upperclass work. On the Co-operative Plan, the upperclass courses are evenly distributed over four years so that each division of co-operative students has 25 weeks of college work, 26 weeks of co-operative work, and one week of vacation annually.

A complete list of the courses of instruction offered in each of the Day Colleges is included in a special section of the catalog beginning on page 205. This section lists the prerequisite and preparation requirements, class and laboratory hours per week, the number of hours normally required for study preparation hours, and the number of credits which have been assigned to each course.

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

## *Accounting*

*41-01 Introduction to Accounting*—This course presents the fundamental principles of accounting theory and practice in a manner designed to meet the needs of students who intend to specialize in accounting as well as those who require a knowledge of accounting as a preparation for the study of industrial relations, banking and finance, production management, and marketing. Beginning with a consideration of the need for and the purpose served by accounting, a study of the balance sheet and operating statement is presented so that the ultimate goal and purpose of accounting is understood before the mechanical methods of recording business transactions are presented. The basic arithmetic operations will be reviewed and proficiency established in the handling of numbers.

*41-02 Principles of Accounting*—The course takes up specific balance sheet accounts; the law of debit and credit; the theory of nominal accounts; construction and interpretation of accounts; the recording process; the trial balance; construction of financial statements; the need for adjustments at the end of the period; depreciation; deferred and accrued items.

*41-03 Principles of Accounting*—This course continues the work of the first semester with increased emphasis placed on accounting and interpretation of accounts. The main topics covered are closing of books, starting the new period, comparative statements, control accounts, and the operation of petty cash systems.

*41-04 Intermediate Accounting*—This course is a continuation of the fundamental principles of accounting. Greater emphasis is placed, however,

on the accounting aspect of management. Special books, departmental accounts and statements, and accounting for manufacturing are specifically introduced. One of the main features of this course is the introduction of the analytical aspect of accounting.

*41-05 Intermediate Accounting*—The approach of 41-04 is continued with greater stress on the accounting rather than bookkeeping aspects. Continuity is aimed at throughout. Accounting for business organizations occupies the major part of the course. Formation and operation of partnerships and corporations are thoroughly covered. Special emphasis is placed on the valuation of partnership and corporation accounts. Problems dealing with branch accounting, installment sales, and bonds will also be studied in this course.

*41-11 Cost Accounting*—The structure of factory costs from the executive's viewpoint is studied in this course. The subject is approached chiefly from the management point of view. Problems are presented in a summarized form in order to stress the fundamental aspects of costs. Managerial control through the use of accounts is emphasized at the beginning of the course. Some of the specific topics covered are accumulation and distribution of cost data, process cost, job cost, historical cost, estimated cost, standard cost, and spoilage cost.

*41-12 Cost Accounting*—This course is designed to develop in the student the managerial ability to control production, operating, and distribution costs through the use of cost accounting and the budget. Methods of costing and controlling materials, labor, and expenses are considered in detail. Cost variations are analyzed. Joint cost and by-product cost are introduced.

*41-15 Trust Accounting*—Based on the requirements of the Probate Court of Massachusetts, this course will treat with the rules which govern the management of trust estates and the relationship existing between the trustee and the beneficiency, the legal and equitable estate in every trust, and the accounting principles and methods adapted to meet the requirements of periodical settlement of accounts and the reports to the probate court. The powers and duties of the trustee, the management of trust funds and the problems of principal and income are analyzed and studied in detail.

*41-21 Problems in Accounting*—This might be called a seminar in Accounting for it is a course which will vary from year to year at the discretion of the Head of the Department of Accounting. Its purpose is to make sure that the accounting background of all accounting majors is complete.

*41-22 Accounting Problems*—The aim of this course is to develop the broad viewpoint, analytical power, and constructive and critical ability necessary to apply properly a knowledge of accounting principles to specific problems and situations. Consistency in the application of principles is

stressed. Specific topics deal with bonds, annuities, sinking fund, reserves, investment accounting, application of funds, consignment sales, correction of statements, venture accounts, receivers accounts and insurance.

*41-23 Accounting Problems*—The method of approach in this course is like that followed in 41-22. The major portion of the course is devoted to the study of specific problems dealing with capital and revenue expenditures; depreciation, appraisals and reserves; branch accounting; and analysis of statements.

*41-24 C.P.A. Problems*—The purpose of this course is to provide for the application of the knowledge of accounting principles and practice gained in the preceding courses to the analysis and solution of complex problems involving a recognition of the economic, legal, and social aspects of various forms of business organization. The course content consists chiefly of problems given in C.P.A. examinations. All phases of partnership, corporation, bond, depletion, cost accounting, consolidation, municipal accounting, bank accounting, adjustments of complex statements and reports, actuarial problems, and institutional accounting will be covered.

*41-25 C.P.A. Problems*—This is a continuation of 41-24.

*41-26 Auditing*—The course contemplates the application of accounting knowledge to the analysis and interpretation of accounting records. Case material is used to outline the type of procedure best adapted to an intelligent examination of accounting records, and the compilation of reports on which the business manager can base plans for future operations. Specifically, balance sheet audits, detailed audits, and special investigations for credit and other purposes receive attention.

## *Business Law*

*46-01 Business Law I— Contracts*—This course covers the law of contracts as it affects the businessman. Under the law of contracts such subjects are considered as agreements, competent parties, consideration legality, assignment, discharge of contracts, enforcement of contracts, and damages for breach.

*46-02 Business Law II— Negotiable Instruments*—The widespread use of credit instruments in commercial transactions demands a knowledge of the law of bills and notes. After a discussion of the various types of instruments, detailed analysis will be made of requirements for negotiability, negotiation by endorsements of various kinds, the rights of holders in due course, the rights and liabilities of other parties, the requisites for charging other parties, and methods of discharge.

*46-11 Business Law III—Personal Property and Sales*—After an analysis of the law of personal property, emphasis will be placed upon the law of sales with detailed consideration for passing of title to goods, conditions and warranties, the Statute of Frauds, and rights and remedies of buyers and sellers.

*46-12 Business Law IV—Agency*—This course will treat in detail the law of agency with careful attention to agency relationships, rights and duties of the principal and the agent, rights of third parties, and termination of agency.

*46-21 Income Tax Law*—This course is designed to give the student practice in the reading and application of specific laws as they relate to the conduct of a business. It makes use of the knowledge of Accounting and Business Law already obtained and introduces the student to the detailed requirements of tax forms.

## *Business Management*

*45-01 Industrial Management*—The course in industrial management places emphasis on the administrative and profit-making phases of factory and plant operation. A textbook is used to present elementary principles and problem material which are supplemented by lectures.

The first part of the course presents a brief historical background of U.S. industry; this is followed by a treatment of the location of the plant; plant services and material handling; plant design, structure, and layout; standardization, simplification, and specialization.

*45-02 Industrial Management*—This course is a continuation of Industrial Management 45-01. It deals with the control of plant operations. Each department of a modern industrial concern is considered, emphasis being placed on the organization and management problems confronted and how they may be handled, with the intention that the student shall become familiar with the activities and general working of each department and the relationship which the departments hold to one another and to the business as a whole. In detail are considered budgeting, standards of performance (time and motion study, wage systems), organization, routing, scheduling, dispatching, inventory control, quality control, and visual controls such as the organization chart, planning board, and departmental report.

*45-03 Business Machines*—This is a laboratory course to introduce the basic machines used in most business offices and to develop some proficiency in the operation of them.

*45-04 Business Machines*—This is a continuation of 45-03.

*45-21 Public Administration*—This is a study of career service of local, state, and national government with emphasis upon positions with the

various administration agencies. Some attention will be accorded the philosophy of the administration agency itself. It analyzes public administration in terms of the subject matter and principles of industrial management.

*45-22 Public Administration*—This course presents a study of the public relations, fiscal control, and policy-making aspects of public administration, stressing the importance of co-operation among government bureaus, legislative bodies, and the public; and presents to the student an appreciation of the importance of versatility of ability for a successful public career.

*45-23 Traffic Management*—The organization and functions of the traffic department comprise the point of departure for this course. Major attention is paid external problems of agency, packing, shipping, routing, government regulations, etc. Internal problems of writing, methods, handling are also covered. The importance of the work of the traffic department in connection with over-all efficiency is emphasized.

*45-24 Advanced Management*—This course will analyze by the case method timely significant problems that general management faces. Specific course content will vary but the student will learn by practice how to tackle the more complex problems of everyday business.

*45-25 Purchasing and Procurement*—This is a study of the organization, functions, and duties of the purchasing department and its relations with other departments. Topics covered will include specifications, sources of supply, types of procurement and governmental regulations, inventory controls, tests and inspection, and traffic problems.

*45-31 Business and Government*—The object of this course is to develop a thorough understanding of the relationships between government (local, state, national) and business. The attitudes of our government towards business since 1885 as evidenced by legislative, judicial, executive, and administrative action will be analyzed in detail.

*45-32 Business Policy*—This course is set up as a seminar for B.A. Seniors in which the members of the class will examine the problems that the business executives face daily in their relations with government, labor, the market, and the community. The ethical features of business policy formation will be stressed along with the social implications. An attempt will be made to determine the criteria by which fair business practices can be distinguished from unfair.

## *Drawing*

*12-05 Technical Drawing*—A course which presents the fundamentals of the graphic language as it is employed in business and industrial relation-

ships and intended to facilitate a better understanding between the fabrication and marketing phases of industrial products. The course includes a study of drawing equipment and its use, lettering, geometric constructions, multiplaner orthographic projection, freehand and technical sketching, pictorial representation, and elements of dimensioning, with a study and interpretation of drawings from the various industrial fields.

## *Economics*

*20-01 Economic Geography*—In order to provide an adequate background for the study of economics and to develop a better understanding of the world in which we do business, the course, Economic Geography, is divided into three parts. The first part is primarily concerned with fundamental geographic and geologic principles and facts.

*20-02 Economic Geography*—This is the second part of Economic Geography and emphasizes the socio-economic principles that underlie the development of resources in the different countries and climates of the world.

*20-03 Economic Geography*— This is the third part of Economic Geography and analyzes the politico-economic aspects of resource distribution and development in the form of trade and world relationships. The student will now be able to derive any two of the following bodies of information if given one of them: resources, living habits and institutions, climate.

*20-13 Economic Principles*—A thorough grounding in the fundamental principles and laws of economics is the aim of this basic course. The main topics include the nature and organization of production, the nature and importance of wants, the relation of money and prices, the process of exchange, the nature of international trade, the determination of price under conditions of competition and monopoly, the distribution of wealth and income in the form of wages, economic rent, interest, and profits.

*20-14 Economic Problems*—In this course the application of economic principles to some of the major economic problems of modern society is emphasized. The problems studied include consumption, protective tariffs and subsidies, labor problems such as unemployment and labor unions, and the business cycle.

*20-15 Economic Problems*—A continuation of 20-14 Economic Problems. Among the problems considered are the following: price stabilization, the agricultural problem, the relation of government to business including the control of monopolies and public utilities, insurance, public finance and proposals for the remodeling and improving of the economic system.

*20-18 American Economic History*—The economic development of the United States is traced from the colonial period to the present with special emphasis upon the period since the Civil War. Stress is laid upon the importance of economic factors and changes in our history in the description of the development of manufacturing, agriculture, domestic and foreign commerce, finance and banking, transportation and labor organizations. Consideration is given to European developments which have been closely related to those of the United States.

*20-20 Statistics in Business*—This course is intended to give the student an understanding of statistical principles and methods and their practical application in the administration of modern business. A study is made of the nature, sources, collection and organization of business facts; the presentation of such facts in tabular or graphic form, the various averages, measures of dispersion, and the construction and use of index numbers. Laboratory periods provide an opportunity for each student to demonstrate his ability to apply the principles studied.

*20-21 Statistics in Business*—The major portion of this continuation of 20-20 Statistics in Business concerns the analysis of time series and includes the methods of obtaining trends, seasonal indexes, and the measurement of cyclical variation. Correlation of time series is related to the problems of business forecasting. In the laboratory work each student is required to make a complete analysis of an individual time series, preferably associated with his co-operative work.

*20-26 Labor Economics*—After an intensive study of the application of economic principles to the labor markets and of the development of collective bargaining in the United States, the course will be devoted to an analysis of organization of unions, rights and responsibilities under the law, the bargaining process as reflected in the labor contract, and grievances and grievance procedures.

*20-27 International Economic Relations*—A careful examination of the important principles of international trade and finance precedes a critical survey of the international commercial policies of modern nations, with special reference to the United States. Such broader problems as the international control of raw materials, exchange restrictions, international cartels and the economic activities of international organizations are considered.

## *English*

*30-01 English I*—A review of basic sentence structure and the grammatical functions of clauses and phrases, followed by a study of effective sentence writing, paragraph development, and reading techniques. Theme assignments are planned to develop practical skill in each of the phases studied.

*30-02 English I*—A study of the structure and organization of written compositions: outlining, development of compositions by phases, and the analysis of expository writings. Experimental work in each phase is carried out by means of theme assignments and readings.

*30-03 English I*—A study of the problems peculiar to each of the four main types of discourse: exposition, description, narrative, and argument. Theme work includes, in addition to these basic types, some assignments in the framing of reports and the writing of business letters.

*30-04 Introduction to Literature*—A study of the aims and techniques of various common types of literature: the play, the short story, lyrical and narrative poetry, and the literary essay. Instructional methods include assigned reading and the writing of short critical reports.

*30-05 Public Speaking*—The fundamentals of good speech with emphasis on the conversational approach and a maximum of actual speech experience. The course aims to help the student meet the everyday demands of modern business, professional, and social life for clear, concise, and pleasing oral expression.

*30-06 Public Speaking*—A continuation of 30-05 with particular attention to speech organization, audience analysis, and the problems of impromptu speaking.

*30-08 Business Communication*—A survey of the basic techniques and forms of expression and communication in business. The principles and methods of oral communication are studied, with emphasis on the oral report, the discussion, the conference, and types of informal speech. By the use of cases, problems, and class exercises, the student is given practice in the forms of business communication.

*30-10 Problems in Writing*—A course in the clear, accurate, and effective presentation of factual data, opinions, policies, and judgments. Emphasis is laid on sound organization, completeness of data, and pointed expression.

## *Government*

*22-01 American Government and Politics*—The study of our National Government with respect to its organization, functions, and constitutional powers and limitations.

*22-02 American Government and Politics*—A continuation of 22-01. Particular attention is paid to the legislative, administrative, and judicial machinery under the party system of government. The problems of bureaucracy are analyzed.

*22-03 American Government and Politics*—A study of the relationships of our federal, state and municipal governments. Consideration is given

to the various types of state and municipal governments with respect to the state and local agencies for carrying out the executive, legislative, and judicial functions of government in a democratic country.

## *History*

*23-01 History of Civilization*—This is primarily a background course. Introductory lectures deal with primitive society, the development of language and writing, and the early contributions of Egypt and Asia. More detail is given to the structure of Greek and Roman society and the rise of the Christian Church.

*23-02 History of Civilization*—A continuation of 23-01. This course considers the decline of the Roman Empire, the barbarian invasions of the Empire, the growth of Islam, life in the early Middle Ages, the growth of monarchies in Europe, and the medieval church.

*23-03 History of Civilization*—The Renaissance and the Reformation receive extended attention in this course. Stress is placed upon the art and literature of the era as well as the social, economic, and political developments.

*23-04 History of Civilization*—A continuation of 23-03. The chief topics of the course include the economic revolution, the Age of Reason in France and England, the Old Regime and the Revolution in France, and the growth of science and industrialism.

## *Finance and Insurance*

*44-01 Principles of Banking*—In this course the organization and administration of American banks is described in detail. All banking functions will be examined, but special emphasis will be laid upon the supplying of fixed and operating capital. The ABC of the Federal Reserve System will form an important part of the course along with the banking operations and agencies of our government.

*44-02 Principles of Insurance*—The purpose of the course is to provide a comprehensive knowledge of insurance principles and coverage such as will provide a broad foundation for the student who plans to enter the business of insurance or enable the man or woman in business to plan a satisfactory program for personal needs or business responsibilities. Content: the basic principles of insurance, solving the economic problem of risk, types of insurance contracts, legal interpretation of the insurance contract, types of insurance companies, the needs of the buyer of insurance, co-operative organizations in the field of insurance.

*44-11 Business Finance*—The fundamental principles of finance are approached in this course from the point of view of the businessman. A

study is made of the two basic ways of financing, namely, equity and borrowed funds, and their use in original and expansion financing. In addition, consideration is given to working capital requirements and the distinctions between short-term and long-term financing. This course, also, deals with the application of the principles of finance to such problems as surplus, dividend and reserve policies, the relation of the corporation to banks and the investing public, and the problems of both trade and economic risk.

*44-12 Business Finance*—The corporation, rather than business in general, is here considered. An analysis is made of the changing concepts in the corporation, such as separation of ownership and management, and the roles played by private initiative and private property. Through use of actual examples, a study is made of financial policies affecting sales, prices, markets, and control. The course includes an analysis of such combinations as trusts, holding companies, consolidations, and pools from both the public and financial points of view. Analysis is also made of aspects of reorganization problems in the light of present legislation. The course concludes with an analysis of government and state agencies now supplementing private sources of business funds.

*44-21 Real Estate*—Consideration of land as an economic institution, and the importance of a sound land policy; the problems of owners and builders, the service to be rendered the ordinary purchaser; organization of the real estate office, renting, leasing, and property management; the importance of acquaintance with valuation principles; building operations, the financing of transactions, subdividing and planning; taxation; legal considerations, professional relationships.

*44-22 Investments*—This course consists of a review of the principles of investment, a study of investment policies, and the mechanics and mathematics of investments. It includes a basic study of the advantages and disadvantages of stocks and bonds as media of investment from present and historical points of view.

*44-23 Investments*—A practical study is made of the various fields of investment such as industrials, rails, banks, real estate, government, and foreign investments. Emphasis is placed on security analysis as it pertains to the individual issues. The course not only concerns itself with an intensive study of particular companies and issues, but also includes an analysis of the various current methods of market analysis.

*44-24 Problems in Finance and Insurance*—In this course students are taught to look at the problems confronting banks and insurance companies from the executive's point of view. Through a series of problems, most of which are actual cases, the matter of loan and investment policies will be studied at length with other problems concerning methods of increasing efficiency, volume of business, and earnings receiving the proper amount of attention.

*44-25 Public Finance*—One of the biggest problems confronting the people of all nations following the war will be the question of taxation. In recognition of this fact and of the enormous difficulties facing business organizations and individuals because of the tax burden, the course in Public Finance is offered. This course teaches the kinds of taxes imposed by municipal, state, and federal governing bodies and the effects of these taxes upon the structure of business and its well-being.

## *Industrial Relations*

*42-11 Personnel Administration*—A consideration of what modern industry is doing in making an application of science to the obtaining and retaining of an effective and co-operative working force. The student studies thoroughly personnel administration systems now in use, including the preparation and use of many forms among which are the occupational description, application, and interview blanks, promotion charts, wage scale, personnel control charts, etc. The day-to-day work of the employment office will be covered in detail.

*42-12 Personnel Administration*—This course brings to the attention of the student an understanding of the related, yet varied, problems with which the modern personnel department is confronted. These include problems of guidance, job evaluation, adjustment of rates, employee rating systems, promotion, layoff, restriction of output, and employee security and welfare policies. The effect of governmental regulations upon the work of the personnel department will be examined.

*42-13 Wage Administration*—This is an intensive study of the laws, principles, and practices of government, business, and unions that bear directly upon the wage problem. The purpose is a detailed analysis of a rational wage plan, its creation and administration.

*42-14 Wage Administration*—This is a continuation of 42-13.

*42-16 Testing*—This is a study of the creation and administration of industrial tests. The purpose is to provide a background for organizing a battery of tests, and providing practice in the use of these tests.

*42-20 Production Processes*—This is a course in the techniques, processes, and machines used in the production of manufactured articles. The subject matter is presented in lectures supplemented by slides, exhibits, and demonstrations.

*42-21 Motion and Time Study*—This course comprises a detailed study of time and motion study work, a complete study and actual practice in micromotion which is the use of motion pictures in the motion study work, a preparation of simo-charts (the use of colored charts and symbols called Therbligs which show all the elements in an operation cycle), and the making of process charts which is the use of specifically designed symbols, or industrial shorthand, to record motion analysis.

*42-22 Industrial Relations Seminar*—For advanced study of the actual problems faced by industrial relations departments, with special emphasis upon the relationship between government and labor-management relations. Students will engage in research in order to understand the problems better and to develop familiarity with research methods.

*42-23 Industrial Relations Seminar*—This is a continuation of 42-22.

## *Marketing and Advertising*

*43-01 Principles of Marketing*—This course is designed to acquaint the student with the principles underlying the distribution of merchandise. Textbook assignments and lectures introduce a knowledge of the place of marketing in our modern economic order; the basic structure of markets; the main functions of marketing such as assembling, grading, storing, buying, selling and financing of goods; and the general classification of commodities into major types for the purpose of analytical study. The course gives further and more detailed consideration to the activities of the several types of middlemen such as brokers, wholesalers, and retailers, and their utilization, as channels of distribution; the work of the commodity exchanges and co-operative marketing associations; and the development of chain stores, mail order houses, and department stores.

Other topics considered are market risk, pricing, selling terms and discounts, hedging, advertising, and the legal aspects of price maintenance and discount practices. Supplementary lectures and illustrative material will be given to explain in some detail the methods used in marketing several specific commodities.

*43-02 Principles of Advertising*—The purpose of this course is to acquaint the student with the fundamental principles and facts which must be known by the men and women who are planning to select advertising as a career. The economic background of the subject and its development is presented, together with a survey of the methods for planning and preparing advertisements actually followed in advertising offices. Consideration is given to human instincts, buying habits, argumentative and suggestive appeals, color, headlines, layout, illustrations, and trademarks.

*43-10 Conference Leadership*—The course is divided into two parts: (1) lectures to develop the techniques involved in planning and conducting conferences, (2) practice sessions in the actual handling of conferences.

*43-11 Sales Management*—The study of actual case material forms the basis of this course. In each case the facts are analyzed and a solution proposed. The major problems of sales management may be stated as questions: What to sell? To whom shall products be sold? At what price and terms shall products be sold? The answering of these questions in-

volves a consideration of merchandising policies and organization, market channels, market research and analysis, and pricing and credit policies.

*43-12 Sales Management*—Continuing 43-11 Sales Management, this course deals primarily with the following problems: sales methods, sales promotion, sales campaigns, management of sales force, and the planning and control of sales operations.

In the field of sales management the solution of problems involves two types of mental effort. First, there is the suggestion of plans or alternatives, a task requiring imagination; second, there is the choice between the alternatives so suggested, a matter of judgment. It is essential that the student of business management acquire the habit of weighing alternatives before deciding, but much more is to be gained if the student possesses and develops imagination.

*43-13 Problems in Advertising and Marketing*—Using actual case material, this course analyzes and suggests solutions to a wide variety of selling problems in typical industries and trades. It is aimed throughout to develop the analytical powers of the student so that he may decide a problem from the viewpoint of a marketing or advertising executive. Consideration is given to consumers' buying habits and buying motives, to the important types of retail and wholesale enterprise, and to an analysis of the channels of distribution with the object of formulating a basis for selecting suitable channels for various products. Careful attention is given to the analysis and solution of a wide variety of advertising problems of the various advertising media. The case method is used throughout the course.

*43-14 Problems in Advertising and Marketing*—This is a continuation of 43-13.

*43-15 Advanced Problems in Advertising and Marketing*—Conclusion of work carried in 43-13 and 43-14 on the basis of individual research.

*43-21 Merchandising*—A primary concern of this course is to develop an approach and a technique for the solution of problems of selling in our complicated markets. The emphasis is upon expense distribution, credits and collections, and special phases of accounting. Consideration is given to fashion, salesmanship, customer service, and the training and welfare of employees.

*43-22 Merchandising*—This course is divided into two parts. First, it does for other fields what 43-21 does for the retail field. The course will, therefore, analyze selling of industrial goods, wholesaling, co-operative policies and procedures, and other middlemen's functions and organizations. Secondly, this course will study the whole field of merchandising from the point of view of the advertising department, the part it plays, why, and how.

*43-23 Store Management*—The purpose of this course is to study the principles of successful retailing and to solve actual problems involving these principles. Layout, location and equipment of retail stores are first considered. Store organization, market contacts, buying, receiving and marking merchandise, and invoice procedure are taken up next. Mark-up and mark-down are dealt with in detail through practical examples requiring solution by the students, as are inventory and stock control methods. Merchandise planning is discussed and illustrated.

*43-24 Marketing Research*—The purpose of this course is to show the student what market research is and how it is conducted. It analyzes the different checks and tests used to measure the effectiveness of sales promotion work. It points out in some detail the reasons why research has become an important part of the marketing-advertising mechanism.

## *Mathematics*

*14-25 Mathematics of Finance*—This course starts with the algebra and logarithms necessary for the understanding and use of the formulas developed in business mathematics. Then the subjects covered are interest, discount, annuities, sinking funds, depreciation, amortization, valuation of bonds, the use of graphs, the interpretation of statistical data, and insurance.

## *Physical Education*

*16-01 Hygiene*—This course aims to provide the student with fundamental information which will be useful in developing and maintaining good health and in the practice of personal hygiene. The course includes enough of the fundamentals of physiology and anatomy to enable the student to understand such parts of the work as require some knowledge of these subjects.

*16-02 Hygiene*—A continuation of 16-01 completing a study of the function and care of the several systems of the body.

*16-10 Physical Training*—All first-year men students are required to take physical training. Health, strength, and vitality do not come by chance, but by constant attention to those factors involved in their development. It is very essential for the student to acquire good habits of life.

The work in the course includes a formal calisthenic program, special exercise classes for the correction of postural defects, participation in the regular athletic program, including baseball, basketball, hockey, track, and many types of informal games. All members of the class are also required to learn to swim.

Students wishing to be excused from physical training, because of physical defects, are required to present a petition to the faculty supported by a physician's certificate.

*16-11*—This is a continuation of 16-10.

*16-12*—This is a continuation of 16-11.

## *Psychology*

*25-01 Introductory Psychology*—An elementary study of the structure, functions, and laws of mental life. The course considers the special relation of psychology to the social sciences; the scientific approach to a study of mental processes; the dynamics of animal and human behavior; the relationship between the individual's environment, his response mechanisms, and his personality; the biological and social sources of drives, desires, wishes, and incentives and their relation to interest, effort, adjustment, and maladjustment.

*25-02 General Psychology*—The course makes a systematic study of the psychological mechanisms underlying human behavior and it presents the more important theories of thought and action. It deals with the neurophysiological and psychological mechanisms involved in learning, memory, thought, imagination, motivation, emotion, sensation, and perception; the nature and extent of individual differences; aptitudes and aptitude testing. It emphasizes the practical application of psychological principles to mental and social adjustment. It presents the main problems in psychology and gives the points of view of the different schools of thought.

*25-23 Industrial Psychology*—A study of the principles and techniques of psychology in their relation to the problems which affect industrial efficiency. The course includes such topics as training and transfer, fatigue, monotony, motivation, accident prevention, conditions and methods of work, vocational fitness, adjustment, and the techniques of human control.

Special consideration is given to the motives controlling owner and manager of industry and that of the employees; to the conflicts of desire which result; to the emotional appeals which are used to resolve these conflicts; and to the unconscious impulses which are rationalized in idealistic and philosophical formulations.

*25-24 Industrial Psychology*—A continuation of 25-23.

## *Sociology*

*26-01 Principles of Sociology*—In presenting a survey of the origins and sources of human society, this study provides orientation for the course in principles and problems which follows. The several theories of organic evolution are discussed. The antiquity of man and basic anthropological data are considered. The racial and ethnic groupings of man are then studied in the light of biological, geographical, and cultural factors.

*26-02 Principles of Sociology*—Facts and principles basic to a general knowledge of the field of sociology are presented. The origins, forms, and forces of human associations are discussed. A study is made of the principal socio-political groups such as socialism, communism, fascism, and democracy. The course is practical in emphasis and is designed to meet the needs of the student who desires a survey of the subject.

## *Business Administration Theses*

A thesis in the College of Business Administration is considered to be an essay involving the statement, analysis, and solution of some problem in a special field of business administration. Its purpose is to demonstrate a satisfactory degree of initiative and power of original thought and work on the part of the candidate. A mere resume of existing knowledge in some subject is not acceptable. This, it is true, must usually be made, but in addition thereto the student must show his ability to deal constructively with the data he has collected and his power to draw significant and reliable conclusions from his investigations. The completed thesis will be examined for acceptance or rejection from the technical viewpoint by the departments interested and then forwarded to the Secretary of the Faculty. Final approval of the thesis rests with the Dean. When it is accepted, the thesis becomes the property of the school and it is not to be printed, published, nor in any other way made public except in such manner as the department and the Dean shall jointly approve.

Theses are not required of seniors in the College of Business Administration. To certain students who wish to do so, however, the privilege of writing a thesis may be granted by the Dean in accordance with the following regulations:

1. To be eligible to write a thesis a student must have attained a scholastic average of at least 2.0 or better during the middler year and the first half of the junior year.
2. Students who have met this minimum requirement may petition the Dean for the privilege of substituting a thesis for any one of the required courses of the fifth year.
3. In his petition the student must state the subject which is to be investigated and give a brief statement of the purpose and scope of the proposed thesis.
4. Petitions for the privilege of writing theses must be submitted in writing to the Dean not later than the middle of the second college period of the junior year.

# NORTHEASTERN UNIVERSITY

## COLLEGE OF

# ENGINEERING

*Admission Requirements and Courses of Study*

1947-1948

(CO-EDUCATIONAL)

BOSTON 15, MASSACHUSETTS
JANUARY, 1947

# THE COLLEGE OF ENGINEERING
## *Aims and Methods*

ENGINEERING has been defined as the art of applying the resources of naterial and po ver in nature to the use and convenience of man. The design and construction of bridges, power plants, water works, skyscrapers, industrial plants, machinery, transportation systems, and communications systems thus clearly fall within the scope of engineering. And as scientific research has advanced into new areas, the task of putting these discoveries to practical use has also fallen to the engineer.

Because an engineering education teaches the student to search out the truth, to think clearly, and to formulate conclusions based upon a solid foundation of facts, engineers are being called upon more and more to occupy positions of responsibility in the management of our great industrial enterprises. Even in such diverse fields as banking, public health, and public administration, this so-called engineering approach is in demand.

In consequence of this extremely wide field of endeavor open to engineers, the problem of providing a technical training adequate to cope with the design and construction of buildings, machinery, and equipment, and at the same time a training broad enough to develop a well-rounded personality and a sense of social responsibility, is by no means simple of solution. Northeastern University seeks, by means of its educational program, first of all to develop students of well-rounded personality capable of meeting and discharging their responsibilities as future citizens and leaders in their own communities. At the same time, the courses of study prescribed for students in the College of Engineering are designed to develop engineers technically competent to undertake professional responsibilities in their chosen fields of endeavor.

To this end, the College of Engineering offers separate curricula in five major branches of engineering, namely, civil, mechanical, electrical, chemical, and industrial. Since a basic training in science and mathematics is essential to all fields of engineering, the first year's curriculum is identical for all engineering students, and it is possible for any of them to change their field of specialization at the end of the first year without loss of time. Students are required to take a number of courses of a cultural nature designed to broaden their point of view and to help develop a well-balanced outlook. Individual laboratory instruction in addition to classroom work is employed as far as possible, and the Co-operative Plan of education, enabling the students to obtain a firsthand acquaintance with actual industrial and engineering operations, goes a long way toward bridging the gap between "theory" and "practice."

# Admission Requirements

Applicants for admission to the freshman class must qualify by *one* of the following methods:

1. Graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed below.

2. Completion of fifteen acceptable secondary school units with a degree of proficiency satisfactory to the Department of Admissions.

3. Examinations.

Applicants whose secondary school records are satisfactory are not required to take entrance examinations in high school subjects, but all candidates for the freshman class are asked to come to Northeastern University to take scholastic aptitude tests.

## *Prescribed Subjects for Admission*

*College of Engineering*

| | |
|---|---|
| Algebra (quadratics and beyond) | 2 units |
| Plane geometry | 1 unit |
| Physics | 1 unit |
| Science, social studies, mathematics and/or foreign language | 6 units |
| English (four years) | 3 units |
| Electives | 2 units |
| Total | 15 units |

A unit is a credit given to an acceptable secondary school course which meets at least four times a week for periods of not less than forty minutes each throughout the school year.

The Committee on Admissions reserves the right to require a candidate to be present for an examination in any subjects that it may deem necessary because of some weakness in the secondary school record.

## *Other Requirements*

These formal requirements are necessary and desirable in that they tend to provide all entering students with a common ground upon which the first year of the college curriculum can be based. But academic credits alone are not an adequate indication of a student's ability to profit by a college education. Consequently, the Department of Admissions takes into consideration, along with the formal requirements stated above, other factors regarding candidates for the freshman class. A student's interests and aptitudes in so far as these can be determined, capacity for hard work, attitude toward classmates and teachers in high school, physical stamina, and most important of all, character, are considered. In this way the University seeks to select for its student body those who not only meet the academic admission requirements but who also give

promise of acquitting themselves creditably in the rigorous program of training afforded by the Co-operative Plan and of being useful members of society.

### *Personal Interview*

A personal interview is always preferred to correspondence, and parents are urged to accompany the applicant whenever this is possible. Effective guidance depends in large measure upon a complete knowledge of a student's background and problems. Parents invariably are able to contribute information that aids the admissions officer in arriving at a decision.

Candidates should visit the Office of Admissions for personal interview if it is possible for them to do so before submitting their applications. Office hours are from 9:00 A.M. to 4:00 P.M. daily; Saturdays to 12:00 M. The Department of Admissions will interview applicants on Wednesday evenings but by appointment only.

### *Application for Admission*

Each applicant for admission is required to fill out an application blank stating previous education as well as the names of persons to whom reference may be made.

A fee of five dollars ($5.00) is required when the application is filed. This fee is nonreturnable.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five-dollar fee to Director of Admissions, Northeastern University, Boston 15, Massachusetts. Checks should be made out to Northeastern University.

Upon receipt of the application, properly filled out, the University secures the references and secondary school record. As soon as possible after the Committee on Admissions has reviewed the completed application, a report of the status with respect to admission will be sent to each candidate.

Early filing of applications is recommended.

The University reserves the right to place any entering student upon an indefinite trial period. Reclassification will be determined upon the academic success of the student.

### *Registration*

Eligibility for admission does not constitute registration. Freshmen will register at the University on Thursday, September 4, 1947, and Thursday, November 13, 1947. Students are not considered to have met the requirements for admission until they have successfully passed the required physical examination.

### *Advanced Standing*

Students transferring from approved colleges will be admitted to advanced standing provided their records warrant it. Whenever a person enters with advanced standing and later proves to have had inadequate

preparation in any prerequisite subjects, the faculty reserves the right to require the student to make up such deficiencies.

Applicants seeking advanced standing should arrange to have transcripts of their previous college records forwarded with their initial inquiry. Students admitted to advanced standing are not eligible for placement at co-operative work until they have completed a full year of academic work at the University.

# Graduation Requirements

The College of Engineering offers five-year curricula, conducted on the Co-operative Plan, leading to the following degrees:

1. Bachelor of Science in Civil Engineering
2. Bachelor of Science in Mechanical Engineering
3. Bachelor of Science in Electrical Engineering
4. Bachelor of Science in Chemical Engineering
5. Bachelor of Science in Industrial Engineering

These curricula are described in the following pages. Since the first year is the same for all engineering students, final choice of curriculum need not be made until the beginning of the second year.

Candidates for the Bachelor of Science degree must complete all of the prescribed work of the curriculum in which they seek to qualify. A total of 234 credit hours is required for the degree. Students who undertake co-operative work assignments must meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

No student transferring from another college or university is eligible to receive the S.B. degree until he has completed at least one academic year at Northeastern immediately preceding his graduation.

## *Scholarship Requirements*

Students who fail to show a satisfactory standard of general efficiency in their professional fields may be required to demonstrate their qualifications for the degree by taking such additional work as the faculty may prescribe. If they are clearly unable to meet the accepted standard of attainment, they may be required to withdraw from the University.

Since the degree must represent competence in the student's chosen professional field, it cannot be awarded for mere low grade completion of the required courses.

## *Graduation With Honor*

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

# Engineering Curricula

## 1. Civil Engineering

The field of civil engineering has to do with the planning and building of all kinds of structures and public works. None of the structures of civil engineers lend themselves to quantity production in a factory. Not only are civil engineering works designed to fit a single location, but ordinarily their value is dependent upon their ability to resist forces tending to move them.

Civil engineering is as old as civilization itself and, until recent times, it embraced all phases of engineering except those of a military character. Today its major branches include topographical, municipal, railroad, highway, structural, hydraulic, and sanitary engineering. It covers land surveying, the building of railroads, soil mechanics, harbors, docks, and similar structures, the construction of sewers, water works, streets, and highways, the design and construction of flood control projects, bridges, buildings, walls, foundations, and all fixed structures.

Because civil engineering covers such a broad field, it is not possible to become expert in all its branches. All of these, however, rest upon a relatively compact body of principles and, broadly speaking, it may be said that the civil engineer deals largely with accurate descriptions of locations (surveys) and with applications of the mechanics of resistance to motion (statics).

Since the first step in every civil engineering project involves accurate measurement of the surface features of the land, of the nature of the soil, and of the character of the underlying rock, the study of surveying and related subjects occupies a large place in the civil engineering curriculum. And since the primary consideration in designing any structure is to make certain that it will withstand safely any forces to which it may be subjected, the mechanics of static bodies, strength of materials, and theory of structures are studied in detail. The curriculum is thus intended to prepare the young civil engineer to take up the work of design and construction of structures, to solve the problems of water supply and waste disposal in urban areas, and to undertake intelligently the supervision of work in allied fields of engineering and in general contracting.

Upon graduation, the young engineer may expect a period of apprenticeship either in the field, surveying and plotting, or in the office, over the drafting board. As experience is gained, the graduate is entrusted with greater responsibilities in actual design and supervision of construction. Those who prefer a roving existence should direct their ambitions toward private fields, while those who prefer a stable home and community life will seek opportunities in the public service of the Federal Government and the various states and municipalities.

## *Curriculum in Civil Engineering (1)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 11-01 | Chemistry | 3 | 3 | 6 | 4 | 11-02 | Chem. | 3 | 3 | 6 | 4 | 11-03 | Chem. | 3 | 3 | 6 | 4 |
| 12-01 | Drawing | 0 | 6 | 3 | 3 | 12-02 | Drawing | 0 | 6 | 3 | 3 | 12-03 | Drawing | 0 | 6 | 3 | 3 |
| 14-01 | Math. | 5 | 0 | 7 | 4 | 14-02 | Math. | 5 | 0 | 7 | 4 | 14-03 | Math. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | | | | | | |
| | | 15 | 11 | 30 | 18 | | | 15 | 11 | 30 | 18 | | | 14 | 11 | 31 | 18 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Chemistry | 3 | 3 | 6 | 2 | 20-11 | Econ. | 3 | 0 | 6 | 3 | 20-12 | Econ. | 3 | 0 | 6 | 3 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 14-04 | Math. | 5 | 0 | 10 | 2½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| 23-05 | Am. Hist. | 6 | 0 | 12 | 3 | 3-01 | Elec. Eng. | 3 | 0 | 6 | 3 | 3-02 | Elec. Eng. | 3 | 0 | 6 | 3 |
| | | | | | | 1-10 | Surveying | 4 | 3 | 5 | 4 | 2-20 | App. Mech. | 4 | 0 | 8 | 4 |
| | | 17 | 3 | 34 | 9 | | | 17 | 6 | 31 | 18 | | | 17 | 3 | 34 | 18 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-05 | Am. Govt. | 4 | 0 | 8 | 2 | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 41-06 | Cons. Costs | 3 | 3 | 6 | 4 |
| 2-30 | Pwr. Pl. Eq. | 5 | 0 | 10 | 2½ | 2-21 | App. Mech. | 3 | 0 | 6 | 3 | 2-22 | Sgth.of Matls | 4 | 0 | 8 | 4 |
| 12-04 | Mach. Draw. | 0 | 9 | 3 | 2 | 2-31 | Thermo. | 3 | 0 | 6 | 3 | 1-20 | Hydraulics | 3 | 0 | 6 | 3 |
| 2-50 | Prod. Proc. | 5 | 0 | 10 | 2½ | 1-11 | Surveying | 4 | 3 | 5 | 4 | 1-12 | Surveying | 4 | 3 | 5 | 4 |
| | | | | | | 13-01 | Gen. Geol. | 3 | 0 | 6 | 3 | 13-11 | Eng. Geol. | 3 | 0 | 6 | 3 |
| | | | | | | 2-40 | Materials | 2 | 0 | 4 | 2 | | | | | | |
| | | 14 | 9 | 31 | 9 | | | 18 | 3 | 33 | 18 | | | 17 | 6 | 31 | 18 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-07 | Eff. Spkg. | 6 | 0 | 12 | 3 | 2-23 | Sgth of Mtls. | 3 | 0 | 6 | 3 | 1-54 | Des. of Struc. | 2 | 4 | 0 | 2 |
| 1-13 | Surveying | 0 | 18 | 0 | 3 | 1-40 | Struc. Anal. | 3 | 0 | 6 | 3 | 1-41 | Struct. Anal. | 4 | 0 | 8 | 4 |
| | Lib. Elective | 6 | 0 | 12 | 3 | 1-49 | Conc.T. Lab. | 1 | 4 | 4 | 3 | 1-50 | Concrete | 3 | 0 | 6 | 3 |
| | | | | | | 1-21 | Hydraulics | 3 | 0 | 6 | 3 | 2-64 | Test. Mat. L. | 1 | 4 | 4 | 3 |
| | | | | | | 44-13 | Cons. Fin. | 3 | 0 | 6 | 3 | 2-24 | Adv. Mech. | 3 | 0 | 6 | 3 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 12 | 18 | 24 | 9 | | | 16 | 4 | 34 | 18 | | | 16 | 8 | 30 | 18 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46-03 | Contracts & Agency | 6 | 0 | 12 | 3 | 1-42 | Struct. Anal. | 3 | 0 | 6 | 3 | 1-43 | Struct. Anal. | 4 | 0 | 8 | 4 |
| 50-01 | Prof. Devel. | 6 | 0 | 12 | 3 | 1-51 | Concrete | 3 | 0 | 6 | 3 | 1-57 | Found. Eng. | 2 | 0 | 4 | 2 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 1-55 | Des. of Struc. | 3 | 6 | 0 | 3 | 1-56 | Des. of Struc. | 0 | 9 | 0 | 3 |
| | | | | | | 1-24 | San. Eng. | 3 | 0 | 6 | 3 | 1-25 | San. Eng. | 3 | 3 | 6 | 4 |
| | | | | | | 1-30 | Transp. | 4 | 0 | 5 | 3 | 1-31 | Transp. | 2 | 0 | 4 | 2 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 18 | 0 | 36 | 9 | | | 19 | 6 | 29 | 18 | | | 14 | 12 | 28 | 18 |

*Summer term — 5 weeks.

## 11. Mechanical Engineering

The field of mechanical engineering is concerned with the harnessing of power resources by means of machinery to perform useful work. With the increasing mechanization of all industry which has taken place during the last century, the field has so broadened as to include all lines of industry.

In contrast to the civil engineer who deals primarily with static forces, the mechanical engineer is more concerned with the mechanics of motion or kinetics. And because moving parts require constant care and adjustment, the mechanical engineer has the task not only of designing and installing complicated machinery but also of operating it efficiently after it has been installed.

Among the major branches of mechanical engineering are included combustion or power production engineering, machine and machine-tool design, railway mechanical engineering, automotive engineering, aeronautical engineering, refrigerating engineering, and air conditioning engineering. The construction and operation of furnaces, boilers, and engines, the design of all kinds of machinery from pocket watches to steel mills, the construction and operation of railway and other transportation equipment including automobiles and airplanes, and even control of atmospheric conditions by means of heating, and air conditioning equipment, all fall in this field.

Since machinery is so predominantly the concern of the mechanical engineer, the program of study is designed to give the student considerable training in the principles underlying the design and operation of engines, power transmission devices, machine tools, and other machinery. This, of course, implies a thorough study of the physical laws concerning motion and transfer of energy. Applied mechanics and thermodynamics occupy a prominent place in the curriculum. The program of instruction thus gives the student a broad foundation in those fundamental subjects essential to all engineering practice and, in the senior year, provides opportunity for limited specialization.

For those students desiring to specialize in the field of industrial management, attention is called to the curriculum in industrial engineering, the basic training of which is essentially the same as that in mechanical engineering.

The graduate mechanical engineer generally finds employment in an industrial plant, either in design and research or in plant operation and maintenance. And if one's abilities lie in that direction, one frequently is entrusted after a time with greater and greater responsibility for the successful management of the enterprise.

# *Curriculum in Mechanical Engineering (2)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 11-01 | Chemistry | 3 | 3 | 6 | 4 | 11-02 | Chemistry | 3 | 3 | 6 | 4 | 11-03 | Chemistry | 3 | 3 | 6 | 4 |
| 12-01 | Drawing | 0 | 6 | 3 | 3 | 12-02 | Drawing | 0 | 6 | 3 | 3 | 12-03 | Drawing | 0 | 6 | 3 | 3 |
| 14-01 | Math. | 5 | 0 | 7 | 4 | 14-02 | Math. | 5 | 0 | 7 | 4 | 14-03 | Math. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 11 | 30 | 18 | | | 15 | 11 | 30 | 18 | | | 14 | 11 | 31 | 18 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Chemistry | 3 | 3 | 6 | 2 | 20-11 | Economics | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 14-04 | Math. | 5 | 0 | 10 | 2½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| 23-05 | Am. Hist. | 6 | 0 | 12 | 3 | 3-01 | Elec. Eng. | 3 | 0 | 6 | 3 | 3-02 | Elec. Eng. | 3 | 0 | 6 | 3 |
| | | | | | | 1-10 | Surveying | 4 | 3 | 5 | 4 | 2-20 | App. Mech. | 4 | 0 | 8 | 4 |
| | | 17 | 3 | 34 | 9 | | | 17 | 6 | 31 | 18 | | | 17 | 3 | 34 | 18 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-05 | Am. Govt. | 4 | 0 | 8 | 2 | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 3-03 | El. Meas. | 2 | 2 | 5 | 3 |
| 2-30 | Pwr. Pl. Eq. | 5 | 0 | 10 | 2½ | 2-21 | App. Mech. | 3 | 0 | 6 | 3 | 2-22 | Sgth of Matls | 4 | 0 | 8 | 4 |
| 12-04 | Mach. Draw. | 0 | 9 | 3 | 2 | 2-32 | Ht.Eng.Ther | 4 | 0 | 8 | 4 | 1-20 | Hydraulics | 3 | 0 | 6 | 3 |
| 2-50 | Prod. Proc. | 5 | 0 | 10 | 2½ | 5-10 | Ind. Mgt. I | 3 | 0 | 6 | 3 | 5-11 | Ind. Mgt. II | 2 | 0 | 4 | 2 |
| | | | | | | 2-40 | Materials | 2 | 0 | 4 | 2 | 2-33 | Ht. Eng. | 3 | 0 | 6 | 3 |
| | | | | | | 30-07 | Eff. Spkg. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 14 | 9 | 31 | 9 | | | 18 | 0 | 36 | 18 | | | 17 | 2 | 35 | 18 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-37 | Htg & Air Cond. | 6 | 0 | 12 | 3 | 1-21 | Hydraulics | 3 | 0 | 6 | 3 | 2-24 | Adv. Mech. | 3 | 0 | 6 | 3 |
| | | | | | | 2-23 | Sgth of Matl | 3 | 0 | 6 | 3 | 2-25 | Aerodynam. | 3 | 0 | 6 | 3 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-34 | Ht. Eng. | 3 | 0 | 6 | 3 | 2-35 | Ht. Eng. | 4 | 0 | 8 | 4 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-60 | Mech. Lab. | 0 | 3 | 3 | 2 | 2-61 | Mech. Lab. | 0 | 4 | 5 | 3 |
| | | | | | | 2-10 | Mechanism | 0 | 6 | 6 | 4 | 5-15 | Meth. Eng. I | 2 | 0 | 4 | 2 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 18 | 0 | 36 | 9 | | | 12 | 9 | 33 | 18 | | | 15 | 4 | 35 | 18 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-41 | Metallog. | 4 | 4 | 10 | 3 | 2-26 | Eng. Dyn. | 3 | 0 | 6 | 3 | 2-38 | Pwr. Pl. Eng. | 4 | 0 | 8 | 4 |
| 2-66 | Mech. Lab. | 0 | 12 | 6 | 3 | 2-11 | Mach. Des. | 0 | 6 | 3 | 3 | 2-12 | Mach. Des. | 0 | 9 | 6 | 5 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-62 | Mech. Lab. | 0 | 4 | 5 | 3 | 2-63 | Mech. Lab. | 0 | 4 | 5 | 3 |
| | | | | | | 1-46 | Structs. | 3 | 0 | 6 | 3 | 1-47 | Structs. | 3 | 0 | 6 | 3 |
| | | | | | | 2-36 | Ht. Eng. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | | | | | 50-01 | Prof.Dvlpmt | 3 | 0 | 6 | 3 | | | | | | |
| | | 10 | 16 | 28 | 9 | | | 12 | 10 | 32 | 18 | | | 10 | 13 | 31 | 18 |

*Summer term — 5 weeks.

## III. *Electrical Engineering*

Electrical engineering is still comparatively new; it was barely two generations ago that Thomas Edison built the first central electric power station in New York City, and it was only a generation ago that the radio made its first appearance. In consequence, we find this branch of engineering more closely related to research in pure science than are the older branches of civil and mechanical engineering. Moreover, the tremendous developments of the past decade in theoretical physics have been largely in areas closely related to electrical engineering as exemplified by Radar, Amplydine and similar tools used in World War II. So that today greater opportunities for intellectual pioneering appear to exist in this field of engineering than in other branches of the profession.

The electrical industry and the field of electrical engineering are usually divided into two main branches, one having to do with electrical power and the other, communications, with the field of electronics overlapping both. The power group deals principally with large equipment and apparatus employing heavy currents; the communications group handles smaller, more delicate equipment employing small or even minute currents. Electrical engineering thus embraces the generation, transmission, and distribution of electricity for light and power purposes, the operation of all types of electrical equipment including telephone, telegraph; and industrial electronics, radio, television and ultra-high frequency as well as lamps, motors, and household appliances. In addition, the field of illuminating engineering, having to do with the problems of proper light intensities, has in recent years assumed increasing importance.

Since electricity is without material embodiment and can be treated only by mathematical reasoning, the electrical engineer is frequently required to go into higher mathematics seldom used in other fields. It is also absolutely essential that the electrical engineer who hopes to make a success of his work be able to grasp readily and absorb effectively the meaning and content of the many scientific papers having to do with research in this field. For these reasons, the program of study in electrical engineering includes more work in the pure sciences of mathematics and physics than do the other courses, as well as a solid grounding in engineering fundamentals. This is followed by a thorough study of electrical theory and its applications in the power, high voltage, and electronics fields.

The profession of electrical engineering affords a wide diversification of employment opportunities. If one is research-minded, opportunity to develop one's talents may be found in one of the great laboratories; if one is more interested in plant problems, opportunity can be found in the manufacturing or operating organizations; and if one is sales-minded he may find a career as a sales engineer.

## *Curriculum in Electrical Engineering (3)*

### FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 11-01 | Chemistry | 3 | 3 | 6 | 4 | 11-02 | Chemistry | 3 | 3 | 6 | 4 | 11-03 | Chemistry | 3 | 3 | 6 | 4 |
| 12-01 | Drawing | 0 | 6 | 3 | 3 | 12-02 | Drawing | 0 | 6 | 3 | 3 | 12-03 | Drawing | 0 | 6 | 3 | 3 |
| 14-01 | Math. | 5 | 0 | 7 | 4 | 14-02 | Math. | 5 | 0 | 7 | 4 | 14-03 | Math. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 11 | 30 | 18 | | | 15 | 11 | 30 | 18 | | | 14 | 11 | 31 | 18 |

### SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Chemistry | 3 | 3 | 6 | 2 | 20-11 | Economics | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 14-04 | Math. | 5 | 0 | 10 | 2½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| 23-05 | Am. Hist. | 6 | 0 | 12 | 3 | 3-01 | Elec. Eng. I | 3 | 0 | 6 | 3 | 3-02 | Elec. Eng. I | 3 | 0 | 6 | 3 |
| | | | | | | 1-10 | Surveying | 4 | 3 | 5 | 4 | 2-20 | App. Mech. | 4 | 0 | 8 | 4 |
| | | 17 | 3 | 34 | 9 | | | 17 | 6 | 31 | 18 | | | 17 | 3 | 34 | 18 |

### THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-05 | Am. Govt. | 4 | 0 | 8 | 2 | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 3-13 | Elec. Meas. | 3 | 0 | 6 | 3 |
| 2-30 | Pwr. Pl. Eq. | 5 | 0 | 10 | 2½ | 2-21 | Appl. Mech. | 3 | 0 | 6 | 3 | 2-22 | Str. Mat. | 4 | 0 | 8 | 4 |
| 12-04 | Mach. Draw. | 0 | 9 | 3 | 2 | 2-31 | Thermo. | 3 | 0 | 6 | 3 | 1-20 | Hydraulics | 3 | 0 | 6 | 3 |
| 2-50 | Prod. Proc. | 5 | 0 | 10 | 2½ | 3-10 | D.C. Mach. | 5 | 0 | 7 | 4 | 3-11 | Adv.AC The. | 3 | 0 | 6 | 3 |
| | | | | | | 2-40 | Materials | 2 | 0 | 4 | 2 | 3-12 | E.E.Lab.D.C. | 1 | 3 | 2 | 2 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 14 | 9 | 31 | 9 | | | 19 | 0 | 35 | 18 | | | 17 | 3 | 34 | 18 |

### FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30-07 | Eff. Spkg. | 6 | 0 | 12 | 3 | 2-23 | Str. Mat. | 3 | 0 | 6 | 3 | 3-19 | El.Fld.Theo. | 3 | 0 | 6 | 3 |
| 3-14 | E.E.Lab.D.C. | 2 | 6 | 10 | 3 | 3-15 | Polyphase | | | | | 3-20 | Transformers | | | | |
| | Lib. Elect. | 6 | 0 | 12 | 3 | | AC Circ. | 3 | 0 | 6 | 3 | | Theory | 3 | 0 | 6 | 3 |
| | | | | | | 3-16 | Electronics | 3 | 0 | 6 | 3 | 3-21 | Electronics | 3 | 0 | 6 | 3 |
| | | | | | | 3-17 | Elec. Meas. | 4 | 0 | 5 | 3 | 3-22 | A.C.Test Lab. | 1 | 3 | 5 | 3 |
| | | | | | | 3-18 | E. Meas. Lab. | 0 | 3 | 6 | 3 | 3-23 | ElectronicLab. | 1 | 3 | 5 | 3 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 14 | 6 | 34 | 9 | | | 16 | 3 | 35 | 18 | | | 14 | 6 | 34 | 18 |

### FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-24 | Electronic L. | 2 | 6 | 10 | 3 | 3-26 | Syn. Mach. | 3 | 0 | 6 | 3 | 3-30 | Ind. Mach. | 3 | 0 | 6 | 3 |
| 3-25 | Adv. Meas. L. | 0 | 6 | 12 | 3 | 3-27 | H. F. Eng. | 3 | 0 | 6 | 3 | 3-31 | H. F. Eng. | 3 | 0 | 6 | 3 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 3-28 | Trans.Lines | | | | | 3-32 | Filters | 3 | 0 | 6 | 3 |
| | | | | | | | & Ntwrk | 3 | 0 | 6 | 3 | 3-33 | H. Freq. Lab. | 1 | 3 | 5 | 3 |
| | | | | | | 3-29 | Ad.F'ld Th. | 3 | 0 | 6 | 3 | 3-34 | Adv.E.E.Lab. | 1 | 3 | 5 | 3 |
| | | | | | | 2-65 | Mech.E.Lab. | 2 | 3 | 4 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | | | | | 50-01 | Prof.Dvlpmt | 3 | 0 | 6 | 3 | | | | | | |
| | | 8 | 12 | 34 | 9 | | | 17 | 3 | 34 | 18 | | | 14 | 6 | 34 | 18 |

*Summer term — 5 weeks.

## IV. *Chemical Engineering*

The field of chemical engineering is relatively new. It has grown out of the discoveries of the chemical laboratories which have served as a foundation for a great many new industries whose production processes involve chemical as well as physical changes. Petroleum refining, coal carbonization, plastics, manufacture of nylon and cellophane, and hundreds of other industries require men and women trained in chemistry as well as in engineering. Many older industries such as foods, textiles, and leather are also employing chemical engineers.

The chemical engineer has been defined as a "professional man experienced in the design, construction, and operation of plants in which materials undergo chemical and physical change." It is the duty of the chemical engineer to cut the costs, increase production, and improve the quality of the products in the industry.

The chemical engineer must possess a working knowledge of the fundamental sciences and must understand and know how to work with people. In addition it is necessary that the chemical engineer recognize clearly the "correct appraisement of values and costs" and possess a knowledge of the ability to apply the knowledge possessed to the development and operation of chemical processes and plants.

In addition to the fundamental courses in chemistry, mathematics, and physics required of all engineering students, a considerable amount of time is devoted to more advanced work in chemistry as a foundation for the study of chemical technology. Instruction in the elements of mechanical and electrical engineering also gives the student a fairly broad engineering background upon which to base his study of chemical engineering unit operations. Courses of a more liberal nature are included in the curriculum in order that the student may broaden his educational background. Since the field of chemical engineering is so varied, the curriculum has been designed to give the students a broad training rather than a specialized training in one specific industry. It is believed that this training will enable the students readily to acclimate themselves to whatever industry they may choose to enter.

Because of the complex nature of many chemical processes and because of the difficulty of translating laboratory results into full-scale plant operations, there has developed in many chemical plants the so-called semi-works or pilot plant. Here new processes developed by the chemists in the research laboratory are put to the test of actual plant conditions on a small scale. And it is here that the young chemical engineers often find themselves upon graduation. If they are able to understand the chemist on the one side and the plant operator on the other, and if they are technically competent as well, they will soon find opportunity for advancement either in one of the technical branches of the industry, such as design, development, research, and production, or in the sales and management fields in which chemical engineering is essential.

# Curriculum in Chemical Engineering (4)

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Course | Cl. | Lab. | Pr. | Cr. | No. | Course | Cl. | Lab. | Pr. | Cr. | No. | Course | Cl. | Lab. | Pr. | Cr. |
| 11-01 | Chemistry | 3 | 3 | 6 | 4 | 11-02 | Chemistry | 3 | 3 | 6 | 4 | 11-03 | Chemistry | 3 | 3 | 6 | 4 |
| 12-01 | Drawing | 0 | 6 | 3 | 3 | 12-02 | Drawing | 0 | 6 | 3 | 3 | 12-03 | Drawing | 0 | 6 | 3 | 3 |
| 14-01 | Math. | 5 | 0 | 7 | 4 | 14-02 | Math. | 5 | 0 | 7 | 4 | 14-03 | Math. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 11 | 30 | 18 | | | 15 | 11 | 30 | 18 | | | 14 | 11 | 31 | 18 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Chemistry | 3 | 3 | 6 | 2 | 11-41 | Chem. Lit. | 1 | 0 | 2 | 1 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| 14-04 | Math. | 5 | 0 | 10 | 2½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 2-20 | App. Mech. | 4 | 0 | 8 | 4 |
| 23-05 | Am. Hist. | 6 | 0 | 12 | 3 | 11-11 | Qual. Anal. | 3 | 10 | 5 | 6 | 11-12 | Quant. Anal. | 4 | 6 | 8 | 6 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | | | | | |
| | | 17 | 3 | 34 | 9 | | | 14 | 13 | 27 | 18 | | | 15 | 9 | 30 | 18 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-01 | Flow Fluids | 5 | 3 | 16 | 4 | 20-11 | Economics | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| 22-05 | Am. Govt. | 4 | 0 | 8 | 2 | 2-21 | App. Mech. | 3 | 0 | 6 | 3 | 2-22 | Sgth of Matls | 4 | 0 | 8 | 4 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-32 | Thermo. | 4 | 0 | 8 | 4 | 11-30 | Phys. Chem. | 4 | 3 | 8 | 5 |
| | | | | | | 14-07 | Diff. Equa. | 3 | 0 | 6 | 3 | 4-02 | Ch. E. Calc. | 2 | 0 | 4 | 2 |
| | | | | | | 11-14 | Quant. Anal. | 3 | 6 | 6 | 5 | 41-06 | Const. Costs | 3 | 3 | 6 | 4 |
| | | 15 | 3 | 36 | 9 | | | 16 | 6 | 32 | 18 | | | 16 | 6 | 32 | 18 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-22 | Ch.E.Econ. | 6 | 0 | 12 | 3 | 4-11 | Unit Opera. | 4 | 4 | 10 | 6 | 4-12 | Unit Opera. | 4 | 4 | 10 | 6 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 11-20 | Org. Chem. | 3 | 6 | 6 | 5 | 11-21 | Org. Chem. | 3 | 6 | 6 | 5 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 11-33 | Phys. Chem. | 4 | 2 | 6 | 4 | 11-34 | Phys. Chem. | 4 | 2 | 6 | 4 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 18 | 0 | 36 | 9 | | | 14 | 12 | 28 | 18 | | | 14 | 12 | 28 | 18 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-13 | Unit Opera. | 3 | 6 | 9 | 3 | 4-31 | Ch.Pr.Dev. | 2 | 6 | 4 | 4 | 4-21 | Chem. Plts. | 4 | 0 | 8 | 4 |
| 50-01 | Prof. Dvlpmt | 6 | 0 | 12 | 3 | 3-04 | Elec. Eng. | 4 | 3 | 8 | 5 | 4-32 | Ch. E. Des. | 2 | 7 | 9 | 6 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 4-03 | Ch.E.Ther. | 4 | 0 | 8 | 4 | 4-23 | Eng. Mats. | 3 | 4 | 8 | 5 |
| | | | | | | 11-22 | Org. Chem. | 3 | 0 | 6 | 3 | 30-07 | Eff. Spkg. | 3 | 0 | 6 | 3 |
| | | | | | | 11-25 | Org.An.Lab. | 0 | 6 | 0 | 2 | | | | | | |
| | | 15 | 6 | 33 | 9 | | | 13 | 15 | 26 | 18 | | | 12 | 11 | 31 | 18 |

*Summer term — 5 weeks.

## V. *Industrial Engineering*

It has become increasingly evident that the success of a business or industrial organization, large or small, is dependent upon the skillful direction, supervision, and co-ordination of the various parts of the enterprise. The competent performance of these functions requires a constant supply of industrial managers well trained in the intelligent utilization of men, materials, machines, and money. Industrial engineering is the profession which supplies such individuals who, by aptitude and preparation, are able to apply engineering and scientific principles to the varied problems in the field of production management and effect solutions in the best interests of capital, labor, and consumer.

About sixty years ago, Frederick W. Taylor undertook to apply to the problems of industrial management what we now call "the scientific method" or "the engineering approach." He reasoned that it was management's business to know what constituted a proper day's work and that the way to get the facts was through research and experiment on a scientific basis. He defined "scientific management" not as any device or scheme or gadget, but as a new outlook— a new viewpoint based upon a solid foundation of fact. The methods employed by Taylor and by those who came after him have undergone some modification, but the concept of scientific management which he formulated has gained wider and wider recognition from both employers and employees.

This growing recognition of the value of a scientific approach to the problems of industrial management early created a demand for men and women trained in engineering and science, who possessed a knowledge of business as well, to assume positions of administrative responsibility in industry. To meet this demand, courses were established in many engineering colleges to provide a thorough training in engineering fundamentals together with a specialized training in business administration, which would prepare the students for managerial responsibilities in technical industries. These curricula are variously entitled industrial engineering, administrative engineering or engineering administration, but all are designed to lead ultimately to positions of administrative or executive responsibility, rather than to positions which involve highly specialized engineering responsibility.

The curriculum in industrial engineering, then, provides a course of study which is essentially the same as that for mechanical engineering in the first three years. In the last two years, however, advanced engineering courses are replaced by courses in business management.

Upon graduation, the young industrial engineer may find his way into such factory staff departments as Methods Engineering, Production Planning and Control, Wage Administration, Quality Control, or Time Study. If he prefers, he may select work in Cost Accounting or Statistical Analysis; then again he may incline towards sales engineering activity and serve in the "field" as a Sales and Service representative.

More and more there is opportunity for the experienced Industrial Engineer to serve industry in a consulting capacity. Upon becoming especially skilled in his profession, he is called in by industry for assistance in the installation and maintenance of sound management principles, and to aid in the reorganization of enterprises which have failed.

# *Curriculum in Industrial Engineering (5)*

## FIRST YEAR

| Term 1 | | | | | Term 2 | | | | | Term 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* | *No.* | *Course* | *Cl.* | *Lab.* | *Pr.* | *Cr.* |
| 11-01 | Chemistry | 3 | 3 | 6 | 4 | 11-02 | Chemistry | 3 | 3 | 6 | 4 | 11-03 | Chemistry | 3 | 3 | 6 | 4 |
| 12-01 | Drawing | 0 | 6 | 3 | 3 | 12-02 | Drawing | 0 | 6 | 3 | 3 | 12-03 | Drawing | 0 | 6 | 3 | 3 |
| 14-01 | Math. | 5 | 0 | 7 | 4 | 14-02 | Math. | 5 | 0 | 7 | 4 | 14-03 | Math. | 5 | 0 | 10 | 5 |
| 15-01 | Physics | 3 | 0 | 6 | 3 | 15-02 | Physics | 3 | 0 | 6 | 3 | 15-03 | Physics | 3 | 0 | 6 | 3 |
| 30-01 | English | 3 | 0 | 6 | 3 | 30-02 | English | 3 | 0 | 6 | 3 | 30-03 | English | 3 | 0 | 6 | 3 |
| 16-01 | Hygiene | 1 | 0 | 2 | 1 | 16-02 | Hygiene | 1 | 0 | 2 | 1 | | | | | | |
| 16-10 | Phys. Tr. | 0 | 2 | 0 | | 16-11 | Phys. Tr. | 0 | 2 | 0 | | 16-12 | Phys. Tr. | 0 | 2 | 0 | |
| | | 15 | 11 | 30 | 18 | | | 15 | 11 | 30 | 18 | | | 14 | 11 | 31 | 18 |

## SECOND YEAR

| Term 4* | | | | | Term 5 | | | | | Term 6 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-04 | Chemistry | 3 | 3 | 6 | 2 | 20-11 | Economics | 3 | 0 | 6 | 3 | 20-12 | Economics | 3 | 0 | 6 | 3 |
| 15-04 | Physics | 3 | 0 | 6 | 1½ | 14-05 | Diff. Calc. | 4 | 0 | 8 | 4 | 14-06 | Int. Calc. | 4 | 0 | 8 | 4 |
| 14-04 | Math. | 5 | 0 | 10 | 2½ | 15-05 | Physics | 3 | 3 | 6 | 4 | 15-06 | Physics | 3 | 3 | 6 | 4 |
| 23-05 | Am. Hist. | 6 | 0 | 12 | 3 | 3-01 | Elec. Eng. | 3 | 0 | 6 | 3 | 3-02 | Elec. Eng. | 3 | 0 | 6 | 3 |
| | | | | | | 1-10 | Surveying | 4 | 3 | 5 | 4 | 2-20 | App. Mech. | 4 | 0 | 8 | 4 |
| | | 17 | 3 | 34 | 9 | | | 17 | 6 | 31 | 18 | | | 17 | 3 | 34 | 18 |

## THIRD YEAR

| Term 7* | | | | | Term 8 | | | | | Term 9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22-05 | Am. Govt. | 4 | 0 | 8 | 2 | 14-07 | Diff. Eq. | 3 | 0 | 6 | 3 | 3-03 | El. Meas. | 2 | 2 | 5 | 3 |
| 2-30 | Pwr. Pl. Eq. | 5 | 0 | 10 | 2½ | 2-21 | App. Mech. | 3 | 0 | 6 | 3 | 2-22 | Sgth of Mtls. | 4 | 0 | 8 | 4 |
| 12-04 | Mach. Draw. | 0 | 9 | 3 | 2 | 2-32 | Thermo. | 4 | 0 | 8 | 4 | 1-20 | Hydraulics | 3 | 0 | 6 | 3 |
| 2-50 | Prod. Proc. | 5 | 0 | 10 | 2½ | 5-10 | Ind. Mgt. | 3 | 0 | 6 | 3 | 5-11 | Ind. Mgt. | 2 | 0 | 4 | 2 |
| | | | | | | 2-40 | Materials | 2 | 0 | 4 | 2 | 2-33 | Ht. Power | 3 | 0 | 6 | 3 |
| | | | | | | 30-07 | Eff. Spkg. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 14 | 9 | 31 | 9 | | | 18 | 0 | 36 | 18 | | | 17 | 2 | 35 | 18 |

## FOURTH YEAR

| Term 10* | | | | | Term 11 | | | | | Term 12 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-37 | Htg.&Air.C. | 6 | 0 | 12 | 3 | 1-21 | Hydraulics | 3 | 0 | 6 | 3 | 2-61 | Mech. Lab. | 0 | 4 | 5 | 3 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-23 | Sgth of Mtls | 3 | 0 | 6 | 3 | 5-15 | Methods Eng. | 1 | 2 | 0 | 4 | 2 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 2-34 | Ht. Power | 3 | 0 | 6 | 3 | 42-10 | Personnel | 3 | 0 | 6 | 3 |
| | | | | | | 2-60 | Mech. Lab. | 0 | 3 | 3 | 2 | 41-07 | Th. of Accts | 4 | 0 | 8 | 4 |
| | | | | | | 2-10 | Mechanism | 0 | 6 | 6 | 4 | 20-22 | Ind. Statistics I | 2 | 2 | 5 | 3 |
| | | | | | | | Lib. Elect. | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 18 | 0 | 36 | 9 | | | 12 | 9 | 33 | 18 | | | 14 | 6 | 34 | 18 |

## FIFTH YEAR

| Term 13* | | | | | Term 14 | | | | | Term 15 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-66 | Mech. Lab. | 0 | 12 | 6 | 3 | 2-11 | Mach. Des. | 0 | 6 | 3 | 3 | 5-18 | Qual. Control | 3 | 0 | 6 | 3 |
| 46-03 | Contracts | | | | | 41-08 | Elmts of Cost | | | | | 41-09 | Elmts of Cost | | | | |
| | and Agency | 6 | 0 | 12 | 3 | | Acctg. | 2 | 2 | 5 | 3 | | Acctg. | 2 | 2 | 5 | 3 |
| | Lib. Elect. | 6 | 0 | 12 | 3 | 20-23 | Ind. Stat'tics II | 2 | 2 | 5 | 3 | 42-17 | Prob. in Persnl. | 3 | 0 | 6 | 3 |
| | | | | | | 5-17 | Prod. Pl. Con. | 3 | 0 | 6 | 3 | 43-08 | Sales Eng. | 3 | 0 | 6 | 3 |
| | | | | | | 5-16 | Metd. Eng. II | 2 | 2 | 5 | 3 | 44-14 | Ind. Fin. | 3 | 0 | 6 | 3 |
| | | | | | | 50-01 | Prof. Dvlpmt | 3 | 0 | 6 | 3 | | Lib. Elect. | 3 | 0 | 6 | 3 |
| | | 12 | 12 | 30 | 9 | | | 12 | 12 | 30 | 18 | | | 17 | 2 | 35 | 18 |

*Summer term — 5 weeks.

# Synopses of Courses of Instruction

On the pages which follow are given the synopses of courses offered in the several curricula of the College of Engineering. Curricula in each of the three colleges on either the co-operative or full-time plan comprise 130 weeks of classroom instruction, namely, three ten-week periods in the freshman year and 100 weeks of upperclass work. On the Co-operative Plan, the upperclass courses are evenly distributed over four years so that each division of co-operative students has 25 weeks of college work, 26 weeks of co-operative work, and one week of vacation annually.

A complete list of the courses of instruction offered in each of the Day Colleges is included in a special section of the catalog beginning on page 207. This section lists the prerequisite and preparation requirements, class and laboratory hours per week, the number of hours normally required for study preparation hours, and the number of credits which have been assigned to each course.

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

## *Accounting*

*41-06 Construction Costs*—The fundamental concept of cost and the application of the basic principles of cost accounting to engineering works is the primary purpose of this course. The analysis of the elements of cost in the product unit, job costs, and total cost of construction is studied in detail. The use of cost records as a basis for the preparation of estimates on jobs to be undertaken, the comparison and analysis of estimated and actual cost, and the setting of standards is studied and applied through the working of practical problems.

The methods of assembling and presenting cost data and the use of cost records in measuring and evaluating the efficiency of performance of the organization and its several departments is fully developed.

*41-07 Theory of Accounts*—This course treats of the law of debit and credit, the principle of nominal accounts, the trial balance, and the balance sheet. Consideration will be given to the construction and interpretation of accounts.

*41-08 Elements of Cost Accounting*—This course is designed to meet the needs of the professional engineer. It studies collection of cost data, process and job cost, estimated and standard cost.

*41-09 Elements of Cost Accounting*—This is a continuation of 41-08. It emphasizes methods of costing, cost variations, and budgetary control.

## *Business Law*

*46-03 Contracts and Agency*—The successful practicing engineer needs to be familiar with many legal and ethical principles in order to co-operate in his business relations with lawyers, his colleagues, and businessmen.

This course is designed to give a fundamental knowledge of basic legal principles to the engineering student through the study of the origin and development of law; the elements of contract, the agency relationship and its operation; the law of workmen's liens and the origin and expansion of the law in workmen's compensation.

## *Chemistry*

*11-01 General Chemistry*—The fundamental ideas of matter and energy; the properties of gases; liquids and solids; atomic and molecular weight; equations; properties of solutions; classification of elements.

*11-02 General Chemistry*—Atomic structure and radioactivity; electrons and valence; ionic reactions; acids and bases.

*11-03 General Chemistry*—Chemistry of nonmetals; chemistry of metals; electrochemistry; industrial inorganic chemistry.

*11-04 General Chemistry*—Elements of organic chemistry; industrial organic chemistry.

*11-11 Qualitative Analysis*—Mass action law; ionic equilibria; solubility product; hydrolysis; principles of semi-micro technique; laboratory work is devoted to semi-micro method for analysis of anions and cations.

*11-12 Quantitative Analysis*—Theory and practice of volumetric analysis; weighing; titration; ignition; combustion.

*11-14 Quantitative Analysis*—Theory and practice of gravimetric analysis; mineral procedures; common technical methods.

*11-20 Organic Chemistry*—Reactions and properties of aliphatic compounds; class relationships; structural formulas; reaction mechanisms.

*11-21 Organic Chemistry*—Reactions and properties of aromatic compounds; importance and preparation of industrial aromatics.

*11-22 Organic Chemistry*—Reactions and properties of alicyclic and heterocyclic compounds; unit processes in organic chemistry; halogenation; oxidation, reduction; nitration; sulfonation; amination; and diazotization.

*11-25 Organic Analysis Laboratory*—Chemical and physical tests used in qualitativ eorganic analysis; classification reactions; preparation of derivatives.

*11-30 Physical Chemistry*—Structure of matter: the three states of matter, solutions, collodial dispessions, molecular and atomic structure.

*11-33 Physical Chemistry*—Classwork same as 11-31. Less laboratory work.

*11-34 Physical Chemistry*—Classwork same as 11-32. Less laboratory work.

*11-41 Chemical Literature*—Types of chemical journals; library procedure; problems in obtaining information.

## *Chemical Engineering*

*4-01 Flow of Fluids*—A study of the methods of determining rates of flow and power consumption of fluids flowing through pipe lines. This course differs from the usual course in hydraulics chiefly in the amount of emphasis placed on the flow of gases and oils. Laboratory work is included.

*4-02 Chemical Engineering Calculations*—This is essentially a problem course developed around the study of fuels and combustion. Special attention is given to the principles underlying the methods of calculation, which are of value to the chemical engineer.

*4-03 Chemical Engineering Thermodynamics*—A study of the fundamental principles of thermodynamics as they apply to chemical engineering. Special attention will be given to high pressure operations because of their vital importance. The usefulness of thermodynamics to the chemical engineer for the purpose of determining properties of materials, energy balances, equilibrium conditions, and in determining the availability of energy, the driving force for all unit operations, is emphasized.

*4-11 Unit Operations*—This course consists of a study of the mechanical operations peculiar to the chemical industry. The unit operations studied are flow of heat, evaporation, and air conditioning. Experiments are performed on small-scale plant equipment that has been specially designed or selected for the purpose. Detailed reports are required.

*4-12 Unit Operations*—This course is a continuation of 4-11. The unit operations studied are drying, distillation, gas absorption, extraction, and crystallization. Experiments are performed in the laboratory on the unit operations studied.

*4-13 Unit Operations*—This course is a continuation of 4-12. The unit operations studied are filtration, mixing, crushing and grinding, size separation and conveying. Laboratory experiments are performed.

*4-21 Chemical Plants*—The object of this course is to present to the student a cross section of modern chemical and process industries. The

presentation is through the use of flow sheets with division into the unit operations and unit processes stressed. The chemistry involved, the equipment used, the energy requirements, and the economics of the processes are presented.

The basic inorganic and organic chemical industries are studied intensively and the similarities to other industries are considered.

Plant inspection trips serve to give practicality to the classroom discussion.

*4-22 Chemical Engineering Economics*—The fundamentals of economics and statistics previously acquired by the student are specifically applied to raw materials, markets, labor, power, fuel, water, transportation and similar economic factors as related to the chemical industry. Laws relating to waste disposal, nuisance, and patents are discussed.

*4-23 Engineering Materials*—A study of the properties of materials which chemical engineers utilize in their work. The effect of composition, heat treatment, and mechanical work upon the physical properties of metals and their alloys is emphasized. Other materials are studied in a similar manner.

The causes of corrosion and methods of preventing or minimizing the same are given particular attention.

Co-ordinated laboratory experiments afford practical application of principles and include preparation and examination of metallographic specimens as well as corrosion studies.

*4-31 Chemical Process Development*—This course attempts to teach the fundamentals of research by determining the optimum conditions for carrying out some unit process. After a survey of the literature has been made, a research plan is formulated. Variables are noted and their effect on the chemical process determined through laboratory experiments. The writing of reports is an essential feature of the course.

*4-32 Chemical Engineering Design*—The design of equipment of commercial size forms the basis of the course. Design data are taken from the literature when it is available. Other data are obtained by experiment on small-scale industrial equipment in the laboratory. From these data and information acquired in previous courses, the commercial scale equipment is designed. Students qualified by industrial experience are sometimes assigned problems suggested by their co-operative employer which are worked out under the joint supervision of the plant engineers and the members of the staff.

## *Civil Engineering*

*1-10 Surveying*—Fundamental and basic principles of surveying are presented to the student in this first course in surveying for the following topics: taping, compass, the level, differential leveling, profile leveling, the transit, closed traverse (D.M.D. method), stadia, and the proper

methods of plotting ordinary surveying data. The closed traverse is further studied with particular emphasis on the rectangular co-ordinate method of computing closed traverses. The ordinary procedures for balancing field data and methods of back traversing are thoroughly discussed, preparing the student for horizontal control as a basis for map projections or photogrammetry.

The laboratory portion of this course is devoted to the use and care of the tape, the level, and the transit; and the field work consists of practice taping, leveling, and turning of angles. The student is then required to run a closed differential level circuit, run a small tape and transit closed traverse, and to collect by stadia or by other methods physical features necessary to make a complete map of the traversed area.

*1-11 Surveying*—The first portion of this course deals with horizontal and vertical curves, thus providing the student with basic surveying data for "Route Surveying." Both the railroad curve and the highway curve (circular arc) are studied simultaneously. The rectangular co-ordinate method is used extensively in the study of horizontal control. The various field procedures used when collecting data for cross sections and the methods of obtaining cross-sectional areas are taught. From this raw earthworks data, the student is taught to prepare earthwork tables and diagrams culminating the earthworks portion of this course with the mass diagram solution.

The theory and use of the plane table (including the intersection problem, the resection problem, and three point problem) and the theory of the spiral or transition curve as applied to the railroad and the highway location are also studied.

The data as collected for the closed traverse in course 1-10 are used for complete traverse calculations, by both the D.M.D. and the rectangular co-ordinate methods. The closed traverse is plotted by co-ordinates, and a plan completed by plotting the physical details. At the conclusion of this semester's office work the student is required to submit an inked tracing of this map and a complete set of traverse calculations similar in all details to the requirements as set forth by the Massachusetts Land Court.

*1-12 Surveying*—The celestial sphere and a review of spherical trigonometry are studied as a basis of stellar and solar observations for latitude, longitude, time, and azimuth determinations. The above material is followed by the basic principles of geodetic surveying, namely precise leveling and triangulation; and this course concludes with a discussion of the basic principles of photogrammetry.

In the field portion of this course a random traverse is run as a "Route Survey," and the physical features are located with respect to this traverse. Using the above data, a map is prepared, a location line plotted upon this map, and then the location line is staked out on the ground in the field. At the conclusion of this semester's laboratory work, the student is required to submit a tracing of the map with the location line plotted thereon; and a complete set of calculations for the location line.

*1-13 Surveying*—This course is a continuation of the laboratory portion of course 1-12 where the following surveying problems are performed: precise and Coast and Geodetic leveling; cross sections; earthworks calculations; mass diagram solution; plane table problems; observations on the sun for latitude, longitude, time, and azimuth; observation on Polaris for azimuth; and basic problems of photogrammetry including differential parallax measurements.

*1-20 Hydraulics*—This course is divided into two parts, the first part which treats with the laws of hydrostatics, and the second part which deals with the laws of hydrokinetics.

Under the topic of hydrostatics the following material is studied: open end U gauges, differential manometers, pressure intensity, total pressures, location of center of pressure (horizontally and vertically), pressures on curved and inclined surfaces, hoop tension and end tension, simple dams, and flotation problems.

The laws of hydrokinetics, including those of the flow of liquids through Venturi meter, orifices, short tubes, pipe lines, and open channels are studied with particular reference to Bernoulli's theorem.

In the hydraulic demonstration laboratory the following demonstrations are made: Venturi meter, orifice meter (submerged orifice), discharge of orifice into the atmosphere, discharge through orifice or short tube under falling head, and trajectory of discharge for either a short tube or an orifice.

*1-21 Hydraulics*—This course is a continuation of course 1-20. Equivalent pipes are studied by the Hazen and Williams' flow diagram method, and simple grid systems are studied by both the Hazen and Williams' equivalent pipe method and the Hardy Cross method. Rectangular weirs, with or without end contractions and with or without velocity of approach, together with triangular weirs are studied.

Dimensional analysis is presented to the student so that the student is capable of making model analyses by Froude's number and Reynolds' number. The flow of gases and fluids through closed conduits is considered by the application of Reynolds' number.

This course concludes with the study of open channel flow of the following topics: Lower alternate stage, critical velocity, upper alternate stage, hydraulic jump, and nonuniform flow of the drawdown curve and the backwater curve.

The following demonstrations are made in the hydraulics laboratory: rectangular weirs, triangular weir, pitot tube, and by Reynolds' number apparatus laminary and turbulent flow.

*1-24 Sanitary Engineering*—This is a general course in water supply engineering and the following items are studied: forecasting the future population of a given location; the quantity of water used by the various consumers; rainfall; runoff; storage of ground water and surface water supplies; dams, both earth filled and masonry; slow sand and rapid sand filters; treatment of waters for the removal of hardness, iron and other impurities; disinfection of waters; and the distribution system.

*1-25 Sanitary Engineering*—This is a companion course to 1-24. It deals with the collection and disposal of sewage and storm water, including the following items: the quantity of sewage and storm water to be collected; the combined or separate sewerage systems; the collection of data in order to prepare plans for the design and construction of collection systems, and a discussion of the modern methods of sewage treatment together with the operation of these treatment works.

The laboratory portion of this course is designed to familiarize the student with proper methods of collecting samples of water and sewage; transportation and storage of said samples; and the basic principles of water and sewage analysis for both chemical and bacterial properties.

*1-30 Transportation*—This course consists of a thorough discussion of traffic engineering, administration, surveys and plans of modern highways. The economics of highway rates of grade and general layout features, such as vertical curves, horizontal curves, superelevation, traffic control, accidents and general highway safety, are discussed.

Roadway foundations, grading and excavating equipment as well as highway drainage problems are also considered.

A study is made of soil tests and classifications. The elementary principles of soil mechanics as they are applied to highway and airport design and construction are considered.

The manufacture and testing of bituminous products as well as the construction of the low cost road types (earth and gravel) and methods of soil stabilization are included.

*1-31 Transportation*—A course which is a continuation of 1-30 and includes a detailed discussion of the design and construction of the higher cost types of roadways such as penetrated macadam, Portland cement concrete and asphaltic concrete pavements. A brief discussion of airport design and layout concludes the course.

The application of the latest research developments is considered throughout all phases of the material as given in both this course and 1-30.

*1-40 Structural Analysis*—This first of a series of four courses in structural analysis is devoted to a study of the algebraic and graphical methods of determining reactions, shears, moments and stresses developed by loads acting upon all kinds of statically determinate structures, such as simple roof trusses and simple bridges of the girder and truss type.

This is followed by a discussion of roof loads encountered in practice and the determination of design stresses for a typical roof truss.

Classes are conducted on both the lecture and recitation basis.

*1-41 Structural Analysis*—A continuation of 1-40, covering a discussion of the various types of girder, simple truss, and subdivided truss highway and railway bridges. Consideration is given to the dead load stresses developed in such structures and a complete study of influence lines is undertaken, together with their function in determining the shears,

moments and stresses produced by moving load systems, both distributed and concentrated, with their dynamic or impact effect. Upon conclusion of the dead, live and impact stress studies, a discussion of design stresses is included.

This is followed by a consideration of lateral, sway and portal bracing.

*1-42 Structural Analysis*—A continuation of 1-41, covering the slope and deflection of beams and girders by the method of work, the moment-area process, and the method of elastic weights; and, for truss deflections, by the method of work and the Williott-Mohr diagram.

*1-43 Structural Analysis*—Continuation of 1-42, covering the analysis of continuous beams, simple indeterminate trusses and frameworks (without and with sidesway) by the methods of least work, slope-deflection and moment distribution.

A study is made of the shears, moments and stresses developed in tall building frames by the various conventional methods of treatment.

The course concludes with analyses for the internal effects developed in three-hinged arches and cantilever bridges.

*1-46 Structures*—This course, designed for mechanical engineering students, comprises a study of loads and the analysis of ordinary building frames and trusses encountered in this field, followed by the design of the members of such structures and their connections.

*1-47 Structures*—A continuation of 1-46, covering the transformed area method of design and analysis of reinforced concrete members such as beams and columns. The treatment of combined bending and axial loading follows and the course concludes with a study of the analysis and design of machine bases and foundations.

*1-49 Concrete Testing Laboratory*—This course covers the testing of Portland cement and aggregate as used in forming concrete. The cement tests include normal consistency, fineness, tensile strength, compressive strength, soundness and time of set. Some of the tests usually run on the aggregate include a test for organic impurities, surface moisture, effect of surface moisture (bulking), sieve analysis, structural strength, specific gravity, absorption and unit weight.

Demonstration tests are run by the students to illustrate the water-cement ratio law as well as some of the factors affecting the strength of concrete, such as curing conditions and age. Discussions and laboratory tests are run on some of the various theories of proportioning concrete mixes. The course concludes with tests on brick as used in masonry construction.

*1-50 Concrete*—The fundamental principles involved in the theory of reinforced concrete behavior are thoroughly reviewed and investigated, and the transformed area method of design is developed. This is followed by the application of the method to the analysis and design of

elementary members such as the rectangular beam, the tee beam and beams reinforced in compression. Shear, diagonal tension, vertical and inclined stirrups, bond and anchorage are also treated. In addition, a discussion of specifications and current standard practice is included.

*1-51 Concrete*—Continuation of 1-50, covering the analysis and design of centrally loaded tied and spiral columns with a study of the effects of shrinkage and plastic flow. This is followed by consideration of members subjected to combined bending and axial effects. The balance of the time is spent on the topics of earth pressure, the analysis and design of retaining walls, rectangular and flat slab construction and to the study and interpretation of the Joint Committee Report on Recommended Practice and Standard Specifications for Concrete and Reinforced Concrete as affecting such construction.

*1-54 Design of Structures*—This first course consists of lectures and problem work in the theory and practice of designing connections for various structural elements using rivets, welding and timber connectors. Consideration is given to connections for direct stress and eccentric loading. Bracket connections for fixed end beams are designed and detailed.

*1-55 Design of Structures*—This course is a continuation of 1-54 and consists essentially of the design of the individual members in a structural framework. Tension members, compression members (columns), bending members (beams), and combined direct and flexural stress members.

The latter part of the course consists of the comparative design of a typical interior bay of a building using one-way concrete slab with steel beams, concrete slab with T-beams, and flat slab constructions. Shop drawings are made of the steel beams. Each student uses different design data in working out these problems.

*1-56 Design of Structures*—This course consists of the design of reinforced concrete footings (spread footings, footings on piles and combined footings). A design and shop drawing is made of a plate girder for a building or bridge. The design of continuous beams, both steel and concrete, concludes the course.

*1-57 Foundation Engineering*—By means of lectures and assigned readings and various methods of soil sampling, types of piles, pile driving equipment, pile loading capacity, the destructive action of marine borers and methods of prevention are studied. A discussion of the various types of caissons and cofferdams is included as well as methods of underpinning and the control of ground water in foundation construction. Consideration of dredging operations concludes the course.

## *Co-ordination*

*50-01 Professional Development*—An over-all discussion of job-getting techniques covering in order such items as a survey of the occupational

field wherein the engineering training can be profitably applied, a market survey of opportunities, a study of the accepted techniques related to job-getting efforts, such as qualification records, prospect files, letter writing, interviews, etc., planning and executing the job-getting campaign.

Concurrently and co-ordinated with the foregoing, the purposes, objectives and activities of the professional societies and of the Engineers' Council for Professional Development will be developed with specific reference to the ethics of the profession, the licensing of engineers, and after-college continuation of educational progress.

## *Drawing*

*12-01 Engineering Drawing*—A course in fundamentals of the graphic language as used in engineering. It comprises a thorough study of multiplanar orthographic shape description as the foundation for a later study of working drawings. The work is laid out to include the following divisions: care and use of drawing equipment, freehand lettering, geometric constructions, multiplanar orthographic projection including primary and secondary auxiliary views, freehand and technical sketching.

*12-02 Engineering Drawing*—This is a continuation of course 12-01 and includes a study of pictorial drawing; working drawings and applications of A.S.A. standards. Isometric, oblique and angular perspective are studied in the pictorial field and sections, dimensioning, screw threads, fastenings and ink tracing are applied to simple detail and assembly drawings. Pencil work on vellum is made suitable for the various reproduction processes.

*12-03 Descriptive Geometry*—This is a course in the theory of projection drawing. It is designed to develop powers of visualization and to solve by revolution, auxiliary and direct method problems involving space relationships. In addition to problems with point, line and plane, the course includes a study of intersection and development of surfaces, shadows, mining problems, graphic solution of stresses in framed structures and other problems of a practical nature.

*12-04 Machine Drawing*—Detail working drawings of machine parts and assembly drawings of simple machines are made according to recommendations of the American Standards Association. Such simple phases of mechanism as are essential to a complete understanding of machine drawing are included in the course. Fastenings, machine parts and samples of small machines are made available for reference. Drawings are reproduced by students in blueprint, ozalid, blackline and portagraph.

## *Economics*

*20-11 Economics*—After an analysis of the main characteristics of our modern economic order, attention is turned to the fundamental eco-

nomic laws and principles governing the production of economic goods, the organization of business enterprise, money, banking, the business cycle, control of the price level, and international trade.

*20-12 Economics*—A continuation of 20-11. The first part of the course deals with the principles of price determination under competitive and monopolistic conditions, and the principles underlying the distribution of wealth and income into wages, interest, and profits. Consideration is then given to the major aspects of the economic problems of agriculture, public utility regulation, labor, consumption, public finance, and economic reform.

## *Elective Courses*

Students in the College of Engineering, in order to satisfy the elective requirements, may choose such courses as the following from among those offered by the College of Liberal Arts.

| | | |
|---|---|---|
| *Biology* | —10-10 | General Biology |
| *Economics* | —20-06 | Current Economic Problems |
| | 20-07 | International Economic Relations |
| | 20-08 | Labor Problems |
| *English* | —30-11 | Shakespeare |
| | 30-12 | Great European Writers |
| | 30-14 | Contemporary Drama |
| | 30-15 | Contemporary Novel |
| *Government* | —22-06 | Municipal Government |
| | 22-07 | Government and Business |
| *History* | —23-06 | Modern European History |
| | 23-07 | History of Latin America |
| | 23-08 | History of the Far East |
| | 23-24 | History of Art I |
| | 23-25 | History of Art II |
| | 23-26 | History of Architecture |
| *Modern Languages* | —31-05 | Introduction to French |
| | 31-06 | Introduction to French |
| | 31-07 | Introduction to French |
| | 31-08 | Introduction to French |
| | 32-05 | Introduction to German |
| | 32-06 | Introduction to German |
| | 32-07 | Introduction to German |
| | 32-08 | Introduction to German |

33-05 Introduction to Spanish
33-06 Introduction to Spanish
33-07 Introduction to Spanish
33-08 Introduction to Spanish

*Philosophy* —24-07 Introduction to Philosophy
24-08 Problems of Philosophy

*Psychology* —25-03 Fundamentals of Psychology
25-04 Social Psychology
25-05 Applied Psychology

*Sociology* —26-03 Introduction to Sociology
26-04 Social Ethics
26-05 Social Pathology
26-06 The Family

## *Electrical Engineering*

*3-01 Electrical Engineering I*—This course is designed to give a sound limited background in the field of Electrical Engineering covered by the general topics of electric currents and conductors, electrical measuring instruments, measurement of resistances, electromotive force, electrical network theorems, electromagnetic induction, magnetic circuits and magnetic forces. The material covered being supplemented by basic engineering problems covering these fields which the Civil, Mechanical, and Electrical student will meet in engineering work.

*3-02 Electrical Engineering I*—This course is a continuation of 3-01. It deals with the Electrical Engineering in the field of Alternating Current covered by the general topics, instantaneous voltage, current and power; effective current and voltage; average power; vector algebra (as applied to alternating current); sinusoidal single phase circuit analysis. The problems covering these fields being basic in nature to the general engineering field.

*3-03 Electrical Measurements*—This course comprises a brief study of measurements in general and precision measure as applied to electrical measurements in particular. Resistance devices, galvanometers, ammeters and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their use. This is followed by a detailed discussion of the methods of measuring various electrical quantities: resistance, resistivity, conductance; DC electromotive force, current, power, and energy; induction and magnetic induction. This part of the work involves the student's use of both visual and sound indicating devices. Some consideration is given to the principles and operation of electronic devices. Appropriate laboratory experiments are included.

*3-04 Electrical Engineering*—This course is designed to meet the needs of the Chemical Engineering students in so far as their knowledge of elementary electrical engineering is concerned. This involves a consideration of principles of AC and DC power circuits including motors: their operating characteristics, control and application; selection of motors and their duty cycles. The latter part of the course is devoted to the study of elementary vacuum tube theory, with emphasis on electronic control devices, involving the phototube, thyratron and other tubes applied to circuits used in the chemical engineering industry.

A laboratory course accompanies this lecture course and study is made of both AC and DC motor operation and control, with further work on industrial electronic control devices.

*3-10 Direct Current Machinery*—This course deals with the principles of DC machinery including structural parts of dynamos, armature windings, commutation, armature reaction, ratings, excitation methods and operating characteristics of shunt, series and compound generators. The principles of operation of DC motors are also studied with emphasis on shunt, series and compound characteristics, stray power, efficiencies and applications. Attention is also given to auxiliary protective and control devices as well as to work on DC power transmission.

*3-11 Advanced Alternating Current Circuit Theory*—In this course attention is given to those single-phase AC principles not taken in previous courses. The subject matter includes a study of AC transients in linear circuits, nonsinusoidal wave form analysis, effective resistance and reactance, and elementary filter circuits.

*3-12 Electrical Engineering Laboratory—Direct Current*—This is a laboratory course intended to develop a thorough understanding of the operation of DC machinery as studied in Course 3-10. Experiments include work on armature and field resistance measurements, shunt, series and compound motor load characteristics, manual and electronic control of speed, stray power, generator characteristics and parallel operation of generators. This course also enables the student to develop an ability to make tests of engineering nature and to accumulate and present test data and calculations in the proper accepted report form.

*3-13 Electrical Measurements*—This course is designed to acquaint the student with the theory of precision measure as applied to electrical measurements in particular. Some of the subjects covered are theory of measurements, directly and indirectly measured quantities, recording of observations, rules of significant figures, classification of error, law of error, characteristics of error and law of average deviation.

Most of the problems studied fall in the following two general classifications: (1) Given the precision measures of the directly measured quantities, to determine the precision measure of the indirectly measured quantity as calculated by the use of engineering equations which apply to measurements work. (2) Given the prescribed precision to be ob-

tained in the indirectly measured quantity, to determine the precision measure of the directly measured components which enter into its calculation.

In this course, parts and theory of operation of resistance devices, galvanometers, indicating instruments are discussed. This is followed by a detailed discussion of the methods of measuring various electrical quantities: resistance, resistivity, conductance; DC electromotive force, current, power, and energy.

The principles taught in this course are immediately applied in all experiments run in the measurements laboratory and so far as necessary in the machine testing laboratory.

*3-14 Electrical Engineering Laboratory— Direct Current*—This laboratory course is a continuation of Course 3-12, presenting to the student the more advanced DC machinery experiments. It includes work on stray load losses, retardation method of obtaining losses, electrical supply of losses, separation of losses, heat runs on DC machinery and generator regulation.

*3-15 Polyphase Alternating Current Circuits*—This course deals principally with polyphase circuits. Voltage, current and power relations in polyphase circuits are studied in detail with emphasis on three-phase conditions both balanced and unbalanced. Particular attention is given to the methods of measuring power in these cases and to the application of symmetrical phase components to the solution of unbalanced polyphase circuits. Included also is a study of methods of calculating short-circuit and incremental currents in polyphase power systems under fault conditions.

*3-16 Electronics*—This is an introductory course in electron tubes and is concerned with the motion of electrons in electric and magnetic fields, thermionic emission, static and dynamic vacuum tube characteristics, equivalent circuit methods, and graphical solutions. The object of the course is to give the student a thorough knowledge of the basic construction and operation of thermionic vacuum tubes and to demonstrate the mathematical and graphical procedures used in solving circuit problems.

*3-17 Electrical Measurements*—This course is a continuation of Electrical Measurements 3-13. The measurements of resistance, capacity, inductance, magnetic induction, AC power and energy are treated in this course with a detailed discussion of the methods of measuring them and the standards which apply. This phase of the subject involves the use of both visual and sound indicating devices, and includes some work with the use of circuits and bridges designed for high-frequency measurements, tube constant determination, attenuators and attenuator design. In all this work the student is given a general discussion of the construction, theory of operation, methods of use, sources of error, etc., of the types of measuring instruments and bridges used in commercial and standardizing laboratories.

*3-18 Electrical Measurements Laboratory*—This course consists of a series of experiments emphasizing the principles developed in 3-13 and 3-17. The student becomes familiar with standard testing apparatus and procedure. The experiments include bridge measurements of resistance, inductance, and capacitance, standardizing and testing of instruments and meters. Experiments are also included on networks of various types.

*3-19 Electric Field Theory*—This course is designed to meet the requirement that the student who graduates with a bachelor's degree in electrical engineering have information concerning the fundamentals underlying the techniques of static and dynamic electric and magnetic field theory. The subject matter is taken up in the following order: electrostatics; vector analysis, unit vectors, vector algebra, gradient; divergence, curl, polar co-ordinates; theorems related to fields, curl, scalar potential, solenoidal fields and vector potential; electrostatic fields, conductors, charged sphere, inverse square law, electrostatic energy; dielectrics, polarization; electric current, electromotive force; magnetic fields, magnetic force, magnetic flux, emf by motion, convention signs; fields and wire, magnetic flux linkages; examples and interpretation, boundary surface, fields within conductor, induction; Maxwell's field equations; plane waves, electric fields, magnetic fields, power and Poynting's Vector, reflection; radiation, magnetic vector potential, electrodynamic potential.

*3-20 Transformer Theory*—The purpose of this course is to present a detailed careful study of the construction, theory and operation of transformers used in power work. Both single-phase and polyphase applications are involved, with particular emphasis on regulation and efficiency calculation and test methods. Special types of transformers, such as the constant current transformer, the autotransformer, and instrument transformers are also included.

*3-21 Electronics*—This course is a detailed study of the design, calculation, and operation of vacuum tube circuits. Among the topics considered are low power audio and radio frequency amplifiers, oscillators, modulators, detectors, and measuring equipment. In addition, an introduction to the performance of gas-filled tubes is given. Problems are solved on modern practical circuits and the student is given practice in both equivalent circuit and graphical methods of solution.

*3-22 Alternating Current Test Laboratory*—This is a laboratory course designed to present tests on alternating current circuits and transformers at power frequencies. It includes work on series and parallel R, L, C circuits, resonant conditions, power measurements by the two-wattmeter and polyphase wattmeter methods, load tests on transformers, polyphase transformer connections and the constant-current transformer.

*3-23 Electronics Laboratory*—The experiments performed in this course are based upon the material given in 3-16. They include the determina-

tion of static and dynamic vacuum tube characteristics, tube constants, and the performance of tubes in amplifiers and similar circuits. Emphasis is placed upon checking experimental results with those obtained by calculation.

*3-24 Electronics Laboratory*—The experiments in this course deal with measurements at radio frequencies including broadcast-band and short wave. The types of apparatus experimented upon include a typical superheterodyne receiver, detectors, Class C amplifier, reactance modulator, frequency discriminator, coaxial line, and matching networks. The student acquires practice and experience in using test equipment such as primary and secondary frequency standards, cathode-ray oscilloscopes, vacuum tube voltmeters, and frequency meters.

*3-25 Advanced Measurements Laboratory*—This laboratory course is a continuation of the work done in 3-18. The experiments are intended to give practice in more advanced methods of measurement and to give the student experience in using audio oscillators, vacuum tube voltmeters, cathode-ray oscilloscopes, and similar equipment. Typical experiments are concerned with filters, artificial lines, audio transformers, harmonic analysis, and radio frequency bridge measurements.

*3-26 Synchronous Machinery*—In this course a detailed study is made of alternating current synchronous machines. In addition to the study of the synchronous generator and the synchronous motor, considerable time is spent in discussing the problems involved in operating synchronous generators in parallel.

*3-27 High Frequency Engineering*—This course is based on the material covered in Electronics 3-16 and 3-21 continuing into the field of radio engineering, taking up the following topics: electron conduction of gases, glow and discharge tubes and circuits; power supplies, design and analysis; voltage and current stabilizers, Class B and $AB_2$ power amplifiers, Class C r.f. power amplifiers, trigger circuits and pulse generators.

*3-28 Transmission Lines and Networks*—This course deals with those fundamental principles of the electrically long transmission line which are common to its use, throughout the entire range of frequencies, to the point where circuit theory must be replaced by field theory.

After a brief discussion of skin effect and the variation in the circuit "constants" R L C & G with frequency, the steady state of the line with various terminations is considered, followed by reflection phenomena, the quarter and half wave length (or integral multiples thereof) lines, under open and short circuit conditions, with special attention to the dissipationless and distortionless lines. Then the equivalent T and Pi networks in detail for uniform and composite lines, which is followed by a discussion of insertion loss, iterative and image impedance connections, and finally a thorough discussion of two terminal reactance arms potentially equivalent and inverse, together with a full consideration of Foster's Reactance Theorem.

*3-29 Advanced Field Theory*—This course is based on the material covered in Electric Field Theory 3-19. The material covered may be subdivided into three general classifications: antennas, propagation, and wave guides; the subdivision of these are antennas, low and high-frequency antennas, antenna arrays; propagation, general nature of propagation and dependence on frequency; wave guides; propagation through rectangular and circular guides, resonance phenomena in wave guides, application of resonant elements, practical utilization of wave guides.

*3-30 Induction Machinery*—This course is a continuation of 3-26. It deals with other types of alternating current machinery. The machines studied in detail include the synchronous converter, the mercury arc rectifier, single-phase and polyphase induction motors, induction generators, series and repulsion motors. The method of symmetrical phase components is used in the study of unbalanced conditions in certain types of motors.

*3-31 High-Frequency Engineering*—Continuation of High-Frequency Engineering 3-27, covering the following topics: power oscillators, U H F generators, negative grid oscillator, positive grid oscillator, velocity-modulated tubes and circuits, magnetron and special tubes; light sensitive tubes and cells, electron tube instruments and measurements.

*3-32 Filters*—This course is a continuation of 3-28; beginning with an introduction dealing with the purpose and use of filter networks in general, and next taking up in detail the four principal forms of Low- High- Band-pass and Band elimination; in the Constant K, m-derived and double m types. Then follow methods of improving constancy of image impedance by fractional and mm' terminating half sections; effects of dissipation in filters and methods for allowing and correcting for it; special arrangements in filters when operating in parallel to distribute a broad band of frequencies between different paths without interference.

Some attention lastly is given to the application of filters in power systems for machine-neutral wave-traps, and machine resonant shunts, line shunt filters for modifying resonant characteristics, and rectifying filters both AC and DC for preventing rectifiers from increasing harmonics in AC supply systems.

*3-33 High-Frequency Laboratory*—All of the experiments in this course are performed at frequencies above 300 megacycles. The equipment includes resonant line oscillators, ultra-high-frequency generators, antenna field pattern equipment, wave guides, resonators, and ultra-high-frequency meters. Typical experiments include the determination of field patterns from parasitic and driven antenna arrays, determination of the resonance curve of various resonators at 1000 megacycles, and calibration of an iris diaphragm at 3000 megacycles, etc.

*3-34 Advanced Electrical Engineering Laboratory*—In this laboratory course tests are performed on alternating current machinery involving work on

synchronous motors, the brush-shifting motor, alternator load runs, parallel operation of alternators and synchronizing, and the squirrel cage and wound-rotor types of induction motors. Included also is work on the ignitron rectifier, inverter, electronically controlled synchronizing and AC generator voltage regulation.

## *English*

*30-01 English I*—A review of basic sentence structure and the grammatical functions of clauses and phrases, followed by a study of effective sentence writing, paragraph development, and reading techniques. Theme assignments are planned to develop practical skill in each of the phases studied.

*30-02 English I*—A study of the structure and organization of written compositions: outlining, development of compositions by phases, and the analysis of expository writings. Experimental work in each phase is carried out by means of theme assignments and readings.

*30-03 English I*—A study of the problems peculiar to each of the four main types of discourse: exposition, description, narrative, and argument. Theme work includes, in addition to these basic types, some assignments in the framing of reports and the writing of business letters.

*30-07 Effective Speaking*—A study of the report as a means of oral and written presentation of technical data. Reports of various types are planned and written. Considerable class time is devoted to the presentation of oral reports and oral summaries of written reports.

## *Finance and Insurance*

*44-13 Construction Finance*—The financial problems confronting the setting up of engineering and construction organizations and the methods of providing funds to carry on projects constitute the subject matter to be studied. This will include a consideration of the various forms of business organization from the legal as well as the operational point of view. The uses of capital stock, mortgage bonds, land trust certificates, purchase money mortgages, together with the importance of appraisals in the financing of public projects, projects of private enterprise, public utilities and expansion of these services are studied. The problems of providing working capital and the use of bank credit are also considered.

*44-14 Industrial Finance*—This course covers the ways of financing a business, operating and fixed capital for long and short periods, for the different forms of business current in our economy. Emphasis will be placed upon the corporate forms and the part played by the government in financial control.

## *Geology*

*13-01 Geology*—This introductory course in geology is designed primarily for civil engineering students.

The basic concept of the structure of the earth and a brief discussion of the significance of geological time serves as an introduction to this course. Among the other topics considered are rocks, rock making minerals, weathering, underground water, glacial action, and mountains. Considerable time is given to the discussion of surface water in its various locations such as rivers, lakes, swamps, and the sea and its action. The courses close with lectures on volcanism, deep seated igneous action and earthquakes.

The lectures are illustrated by lantern slides, films and exhibits from a large collection of rocks and minerals available at the University.

*13-11 Engineering Geology*—Geology and its relation to such problems as highways, structures, tunnels, reservoirs and dams. The emphasis is upon the practical application of the information acquired in 13-01, General Geology.

### *Government*

*22-05 American Government*—An analysis of the structure and functions of American Government with emphasis upon its constitutional powers and limitations. Consideration is given to current problems of state and local government.

### *History*

*23-05 American History*—A study of the growth of American democracy with particular attention to the economic phases of our development during the last half-century.

## *Industrial Engineering*

*5-10 Industrial Management I*—The administrative and managerial aspects of factory and plant operation are given thorough treatment in this course. Emphasis is placed upon such managerial functions as budgeting; the selection of the factory location and factory machines and the maintenance of equipment; methods of analyzing production costs and the profit potentials of the business; plant layout, materials handling, and stores keeping; and product standardization, simplification, and specialization. The course is designed to bring to the student a realization of the social and economic significance of the "management movement," to give him an understanding of the management of the physical property of the plant and the organization of the physical plant itself.

*5-11 Industrial Management II*—This is a continuation of course 5-10 Industrial Management I. It deals with the management of manpower and the control of plant operations. The over-all problem of effective utilization of men, materials, machines, and money is considered. These management principles and practices which apply to this problem are presented from the standpoint of practical application under typical shop conditions with emphasis upon the "scientific approach."

Phases of management which are considered in some detail are organization and morale, selection and training, motion and time study,

job evaluation and merit rating, wage payment plans, production planning and control, and cost control. At no time is the student permitted to lose sight of the impact of these managerial activities upon the type of labor-management relations which exist within the plant.

*5-15 Methods Engineering I*—This course presents in detail the functions of the factory staff department commonly known as the Methods Department. These include process analysis through the use of process charts and flow diagrams; the principles and technique of plant layout; operation analysis through the use of operation charts, man-and-machine charts, time study, and micromotion study; the application of the principles of motion economy to all phases of factory operation, clerical and mechanical.

Complete laboratory facilities provide opportunity for the student to apply the subject matter of the course to a typical factory operation set up for this purpose. In the development of the laboratory project, particular attention is given to the method of approach, workplace layout, the elimination of fatigue through the use of labor-saving tools and equipment, and to the problems of installing the approved solution in the factory.

*5-16 Methods Engineering II*—Like the course in Methods Engineering I, the subject matter of Methods Engineering II deals with the activities of a staff department which aids in the "scientific managing" of the factory, in this case the Time Study Department. A discussion of wage incentive plans paves the way for a thorough understanding of the other topics treated in detail; relation of time study to motion study and micromotion study; time study technique and procedure; performance rating, development of concept of "normal," use of personal, fatigue, delay, and other allowances; the analysis of data, treatment of variables, and the preparation of standard data; setting job and element standards directly from time study versus the use of standard data; industrial relations problems connected with the application of time-studied wage incentive plans.

The use of the completely equipped laboratory makes possible the practical application of the principles presented, and permits a critical analysis of the value of the more familiar practices in the field. A highly important part of the course is the study of the use of elemental body motion time values for standard-setting and motion-analysis purposes versus the more conventional time study methods.

*5-17 Production Planning and Control*—This course deals with the highly important "operating management" activity of planning and controlling the flow of materials through the shop and the utilization of the equipment and manpower to best advantage. Although closely allied with the subjects of Methods Engineering, Time Study, and Quality Control, this function of production planning warrants separate treatment.

Included in the course is the following subject matter: factory organization, factory planning and layout, nomenclature, stores keeping con-

trol, development and engineering, planning procedure, scheduling, routing, dispatching, the use of special control charts and boards, forecasting and budgeting.

Of particular importance is the presentation of the special problems of production planning and control as related to the four main types of productive processes: (1) the job-shop type, (2) the mass-production type, (3) the available-equipment type, and (4) the co-ordinated-effort type.

*5-18 Quality Control*—The materials presented in this course are designed to give the student a working knowledge of the theory behind the control chart method and an appreciation of its use. The subject matter includes fundamentals of quality control, theory of control charts, analysis of control chart data, sampling methods, control chart applications, the Poisson distribution, planning for statistical quality control, acceptance sampling, control chart techniques, and industrial applications. Practical adaptations of the method in the solution of quality control problems from local industrial plants aid in familiarizing the student with the possibilities of Quality as a "tool of scientific management" for decreasing costs and increasing production.

## *Industrial Relations*

*42-10 Personnel*—The purpose of this course is to survey the work of the personnel department. The what and how of the employment office will be analyzed along with the current practices in the conduct of human relationships in industry.

*42-17 Problems in Personnel*—This course is an examination of selected problems in industrial relations. The major portion will be devoted to a discussion of wage problems. Other problems such as testing, promotion, layoff, and government regulations will be covered.

## *Marketing and Advertising*

*43-08 Sales Engineering*—This course deals with classification of commodities, structure of markets, and functions of the sales departments. It treats, also, the development of research and, finally, presents by the case method problems covering the broad field of sales management.

## *Mathematics*

*14-01 College Algebra*—The study of algebra is scheduled to begin with the solution of the quadratic equation, simultaneous quadratics, and equations in quadratic form. However, a rapid but thorough review of the fundamentals of algebra precedes this. The solution of the quadratic is followed by a detailed study of the theory of exponents. Then follow radicals, series, variation, inequalities, and the elementary principles of the theory of equations. Considerable time is given to plotting and the

use of graphs in the solution of equations. The elementary theory of complex numbers is also covered.

*14-02 Trigonometry*—This is a complete course in trigonometry and should enable the student to use all branches of elementary trigonometry in the solution of triangles as well as in the more advanced courses where the knowledge of trigonometry is essential. Some of the topics covered are the trigonometric ratios; inverse functions; goniometry; logarithms; circular measure; laws of sines, cosines, tangents, half angles; solution of oblique and right triangles; transformation and solution of trigonometric and logarithmic equations. Considerable practice in calculation of practical problems enables the student to apply his trigonometry to problems arising in practice at an early stage. Additional work, graphical and algebraic, is done with the complex number, introducing De-Moivre's theorem and the exponential form of the complex number.

*14-03 Analytic Geometry*—This being a basic course in preparation for any further study of mathematics, it requires a thorough knowledge of the fundamentals of algebra. The course covers cartesian and polar coordinates; graphs; the equations of simpler curves derived from their geometric properties; thorough study of straight lines, circles, and conic sections; intersections and curves; transformation of axes; plotting and solution of algebraic equations of higher order and of exponential, trigonometric, and logarithmic equations; loci problems. The general equation of the second degree is thoroughly analyzed in the study of conic sections.

*14-04 Introduction to Calculus*—Explicit and implicit functions, dependent and independent variables, some theory of limits, continuity and discontinuity are given special attention from both the algebraic and the geometric points of view. Some theorems on the infinitesimal are introduced, and a study is made of infinity and zero as limits. Relative rates of change, both average and instantaneous, and the meaning of the slope of a curve follow. The differential and the derivative as applied to algebraic functions with the geometric interpretation are then studied. Tangents to curves of the second degree follow here. Simple applications with interesting practical problems help to develop the interest here and lay a solid foundation for the study of the calculus. The introduction of the differential at the same time with the derivative helps considerably to bridge the large gap which usually exists when the student passes from the study of the elementary analytic geometry to the infinitesimal of calculus.

*14-05 Differential Calculus*—The differential is introduced and defined at the outset of the course together with the derivative; geometric and practical illustrations are given of both, and both are carried along throughout the course. The work in the course consists of differentiation of algebraic, trigonometric, exponential, and logarithmic functions, both explicit and implicit; slopes of curves, maxima and minima with

applied problems; partial differentiation; derivatives of higher order; curvature; points of inflection; related rates; velocities, acceleration; expansion of functions; series. Although the subject matter deals with considerable theory, constant sight is kept of the practical application of the theory. The geometric interpretation of every new subject is carefully defined and problems are continually solved dealing in practical applications of the theory in geometry, physics, and mechanics.

*14-06 Integral Calculus*—This is a continuation of Calculus 14-05, and deals with integration as the inverse of differentiation as well as the limit of summation. The topics covered are methods of integration; use of integral tables; definite integrals; double and triple integrals; areas in rectangular and polar co-ordinates; center of gravity; moment of inertia; length of curves; volumes of solids; areas of surfaces of revolution; volumes by triple integration; practical problems in work, pressure, etc., depending on the differential and integral calculus for solution; solution of simpler differential equations.

*14-07 Differential Equations I*—The elementary theory and solution of ordinary differential equations is offered here as a general course in mathematics. Although principally a problem course in solving differential equations, properties of equations and of their solutions are deduced, and applications to the various fields of science are analyzed.

## *Mechanical Engineering*

*2-10 Mechanism*—This course includes mathematical and graphical solutions of problems involving angular and linear velocities and gear trains. It covers a careful study of parts of mechanical movements and the application of velocity diagrams, quick-return mechanisms, and cams. The theory of gear tooth outlines is illustrated by graphical methods, and various miscellaneous mechanisms are considered.

*2-11 Machine Design*—Practice is given the student in the application of theoretical principles previously studied, so that he becomes familiar with the many practical details which must be considered in design work. The problems taken up are both of a static and of a dynamic nature. Typical designs taken up include hydraulic press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone crusher.

In each design, the construction details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, and so forth. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings.

*2-12 Machine Design*—This course comprises a continuation of Machine Design 2-11, with special reference to designs involving dynamic stresses. A thorough discussion of the principles and methods of lubrication forms a part of the course.

*2-20 Applied Mechanics (Statics)*—The subjects treated are collinear, parallel, concurrent, and nonconcurrent force systems in a plane and in space; the determination of the resultant of such systems by both algebraic and graphical means, special emphasis being placed on the string polygon method for coplanar force systems; the forces required to produce equilibrium in such systems; first moments as applied to varying intensity of force and to the determination of centers of gravity of areas and solids; second moments and problems involving static friction, such as the inclined plane and the wedge.

*2-21 Applied Mechanics (Kinetics)*—The subjects treated are second moments and their application to the determination of moment of inertia of plane and solid figures, radius of gyration, polar moment of inertia; product of inertia; principal axes; principal moments; uniform motion, uniformly accelerated motion, variable accelerated motion, harmonic motion, simple pendulum; rotation, plane motion; work, energy, momentum and impact.

*2-22 Strength of Materials*—The topics covered in this course are physical properties of materials, stresses in thin hollow cylinders and spheres, riveted connections of the structural and continuous plate type, welded connections; and beams, covering shearing force and bending moment diagrams, stress analysis of beams, and the design of beams.

*2-23 Strength of Materials*—This is a continuation of the subject matter of 2-22 covering the deflection of beams by the double integration and by the moment-area methods; indeterminate beams and continuous beams; torsion of circular shafts, including stress, horsepower and angle of twist; combined axial and bending loads; and column action in compression members.

*2-24 Advanced Mechanics*—The analysis of stress at a point is treated by analytical and graphical (Mohr's Circle) methods. An investigation of the existing theories of failure is made and the results applied to the special problems of thick hollow cylinders, shafting, curved bars in bending, nonsymmetrical bending, noncircular torsion, flat plates and allied subjects leading to the applications of mechanics in machine design, the elastic theory and photoelasticity.

*2-25 Aerodynamics*—The course comprises a study of the fundamental theory of aerodynamics which underlies all calculations concerning the performance and stability of airplanes including characteristics of airfoils and elementary propeller theory.

*2-26 Engine Dynamics*—The main considerations of this course are the discussion of mechanical vibrations, both free and forced types, particularly those of one degree of freedom and the balancing of engines. Coriolis' law; gyroscopic action; the principles of impulse and momentum both linear and angular, and impact are also treated.

*2-30 Heat Engineering (Power Plant Equipment)*—This course is largely description, and covers most of the equipment used in modern power plants. Particular attention is given to modern boilers, and boiler accessories, ash and coal handling systems, the various types of engines with their valve gears and governing devices, condensers, feed water heaters and pumps. Steam turbines, gas turbines and other prime movers are taken up.

*2-31 Heat Engineering (Thermodynamics)*—In this introductory course in the fundamentals of thermodynamics the following subjects are discussed: general theory of heat and matter; first and second laws of thermodynamics; equations of state; fundamental equations of thermodynamics; laws of perfect gases; properties of vapors including development and use of tables and charts; thermodynamic processes of gases, and saturated and superheated vapors; and the general equations for the flow of fluids.

*2-32 Heat Engineering (Thermodynamics)*—This course covers the same subjects as 2-31 but more extensively. In addition, some time is devoted to the General Equations of Thermodynamics.

*2-33 Heat Engineering*—The principles of thermodynamics are here applied to various problems of heat engineering. These include the fundamental laws governing the flow of gases and vapors through nozzles and orifices with and without friction; the theory of vapor engines, including discussions of the Rankine, the reheating, the regenerative and the binary vapor cycles; and the efficiencies and power calculations for actual steam engines and steam boilers.

*2-34 Heat Engineering*—The principles of heat transfer for steady flow conditions and their applications to practical problems, and the analysis of single and multistage compressor cycles form the first part of this course. The balance of the time is devoted to the history, theory, equipment and applications of mechanical refrigeration. This includes a study of the properties of refrigerants, simple and compound compression cycles, absorption system and the jet or vapor system.

*2-35 Heat Engineering*—The various types of modern airplane, diesel and automobile internal combustion engines are taken up in detail and the theory, analysis, and construction of such engines are carefully studied. The work includes the study of flame travel, the combustion process, efficiencies of the many cycles and types of engines used under different conditions.

The course is based mainly on theory but careful consideration is also given to these data compiled from research in the different phases of internal combustion engineering.

*2-36 Heat Engineering (Steam Turbines)*—A study is first made of the flow of steam through nozzles, dynamic action of jets on moving blades, and

other elements in the design of steam turbines. This material is followed by a consideration of the various types of turbines, their governing mechanisms, condensing equipment, and other constructional details. The principles and performance of gas turbines are treated in the latter part of the course.

*2-37 Heating and Air Conditioning*—The important methods of heating and air conditioning various types of buildings are studied in this course. The principles of heat transfer and air flow are discussed and their application in the various systems are brought out through lectures and problems.

*2-38 Power Plant Engineering*—This course consists of topics and problems chosen largely from engineering practice selected to give to the engineering students a firm grasp of fundamental principles and engineering methods of attacking and analyzing problems in power plant, not only from the point of view of scientific theory, but also with due consideration of the limitations imposed by practice and by costs. Efficiency and operating costs of different types of plants such as steam, hydroelectric, and diesel engines are also carefully studied to determine the type of plant best suited for the conditions and location involved.

*2-40 Materials*—A study of the physical properties, composition and to some extent the methods of production of the ferrous and nonferrous metals and their alloys, plastics, timber, lime, clay products, cement and concrete.

*2-41 Metallography*—This course is designed to show the student the relation between the crystalline structure of metals and their physical properties.

The theory of crystallization and some of the various equilibrium diagrams are studied. Different metallic specimens of known composition are polished, etched, photographed and studied by use of the metallograph and their physical properties are compared. The effect of heat treatment on the crystalline structure is noted.

*2-50 Production Processes I*—A course in the techniques, processes, and machines used in the production of manufactured articles.

Some of the processes covered are heat-treating, forging, welding, foundry practice, die casting, and plastics. The metallurgical principles involved are correlated with good shop practice in each case.

The construction nomenclature, and operation of the following machine tools are discussed: lathe, milling machine, planer, shaper, broaching machine, and grinder.

*2-60 Mechanical Engineering Laboratory*—This course consists of a preliminary series of tests upon various types of apparatus used in steam power plants to illustrate under actual conditions the principles developed in Thermodynamics 2-32. These exercises are in preparation

for more complete tests to be performed during the following semester in 2-61.

The following tests are illustrative of the type of work performed: calibration of gages, plain slide valve setting, tests on steam calorimeters, flow of steam through orifices, weir calibration, steam injector, tests on friction of drives, fuel calorimeters and flow of water in pipes.

*2-61 Mechanical Engineering Laboratory*—This course comprises a series of tests on various types of power plant equipment, more complete than those made in course 2-60. Included in the apparatus tested are the following: steam engine, gasoline engine, steam-driven air compressor, triplex power pump, steam pulsometer, rotary power pump, Pelton water wheel, centrifugal pump, air blower and steam turbine.

A complete report is made on each test describing the machine tested, method of test, results, and discussion, all in accordance with the ASME Power Test Codes.

*2-62 Mechanical Egnineering Laboratory*—The tests in this course deal mainly with the testing of materials of engineering which are of interest to the Mechanical Engineer. Correlation of the tests with the theories of strength of materials, with the heat treatment in the case of steels, and the compositions of brasses, bronzes and alloy steels is an essential part of the work. In addition, some experiments relating to the fields of aerodynamics and the vibrations are also made.

*2-63 Mechanical Engineering Laboratory*—This is a continuation of 2-62. Included in the apparatus tested are the following: steam heating boiler, carrier air conditioner, unit heater, diesel engine, radiator test, oil testing, multistage centrifugal pump, Warren steam pump, hot air heater, and uniflow steam engine. A complete report is required for each test.

*2-64 Testing Materials Laboratory*—A detailed study is made of the methods of inspecting and the testing of the structural materials of engineering. Complete stress-strain diagrams are determined for metals in tension, evaluating the standard physical properties. Other tests are made for the hardness, elastic limit, transverse strength, torsional resistance, compressive strength, column action, impact resistance and bending properties of metals; compressive and transverse tests of timber and the correlation of these tests with the usual standards.

*2-65 Mechanical Engineering Laboratory*—The principles developed in Heat Engineering 2-31 are illustrated by a series of tests on various types of apparatus used in power plants. A report on the equipment tested is made by the student. The following experiments illustrate the type of machines tested: air blower, steam calorimeters, steam engine, steam turbine, air compressor, multistage centrifugal pump, Pelton water wheel, triplex power pump, steam injector and steam heating boiler.

*2-66 Mechanical Engineering Laboratory*—This course consists of a study of the various methods in processing metals, and includes the study of machine tools, small tools, metal working costs and a study of the most effective way of removing metal.

The course also includes a study of the heat treatment of tools, and the use of jigs and fixtures in the operation of modern manufacturing processes.

## *Physical Education*

*16-01 Hygiene*—This course aims to provide the student with fundamental information which will be useful in developing and maintaining good health and in the practice of personal hygiene. The course includes enough of the fundamentals of physiology and anatomy to enable the student to understand such parts of the work as require some knowledge of these subjects.

*16-02 Hygiene*—A continuation of 16-01 completing a study of the function and care of the several systems of the body.

*16-10 Physical Training*—All first year men students are required to take Physical Training. Health, strength, and vitality do not come by chance but by constant attention to those factors involved in their development. It is very essential for the student to acquire good habits of living.

The work in the course includes a formal calisthenic program, special exercise classes for the correction of postural defects, participation in the regular athletic program, including baseball, basketball, football, hockey, track, and many types of informal games. All members of the class are also required to learn to swim.

Students wishing to be excused from Physical Training because of physical defects are required to present a petition to the faculty supported by a physician's certificate.

*16-11 Physical Training*—A continuation of 16-10.

*16-12 Physical Training*—A continuation of 16-11.

## *Physics*

*15-01 Physics*—A study of the fundamental principles of mechanics. The topics treated are kinematics, dynamics, and statics.

*15-02 Physics*—This course completes the study of mechanics, and starts the subject of electricity and magnetism. Energy, power, machines, vibratory motion, elasticity, fluids, magnetism and electrostatics are studied.

*15-03 Physics*—Continues the subject of electricity. The topics covered are resistivity, circuits, electromagnetism, magnetic circuits and condensers.

*15-04 Physics*—Completes the study of electricity. Basic principles of alternating current generation and series circuits, thermoelectric, photoelectric, and thermionic effects, and electromagnetic radiation are the topics studied.

*15-05 Physics*—A first course in the study of light, covering all the details within the scope of standard college texts on the subject. Lectures, demonstrations, and laboratory experiments on selected topics in mechanics and light.

*15-06 Physics*—A study of wave motion, sound and heat. Lectures, demonstrations, and laboratory experiments, the latter covering topics in sound, heat, and electricity.

## *Statistics*

*20-22 Industrial Statistics*—The increasing use of statistics in business and in the field of industrial engineering makes essential an understanding of the fundamental methods and applications of statistical analysis. In this course the important topics considered include the following: the collection of statistical data; the presentation of statistical data in tabular and graphic forms; and the uses and construction of frequency distributions, averages, measures of dispersion and skewness, and the normal curve. Specific attention is given to the practical uses and limitations of statistics in the work of the industrial engineer.

*20-23 Industrial Statistics*—Time series analysis receives major consideration in this course. The standard procedures for measuring, separating, and eliminating trend, periodic, seasonal, cyclical, and irregular movements of time series are carefully studied. Students are required to analyze a time series related to their co-operative employment or to a field of industry in which they have especial interest. The construction of index numbers, the use of currently published index numbers, correlation, and business forecasting complete the course content. Particular regard is paid to the internal use of statistics in industrial concerns.

# NORTHEASTERN UNIVERSITY

DAY COLLEGES

# COURSES OF INSTRUCTION

*in*

*Liberal Arts*
*Business Administration*
*Engineering*

1947-1948

BOSTON 15, MASSACHUSETTS
JANUARY, 1947

# NORTHEASTERN UNIVERSITY

## *Courses of Instruction Offered in the Day Colleges*

LISTED BELOW and on the following pages are the course offerings in the Day Colleges of Liberal Arts, Business Administration, and Engineering. While not all of the courses listed here are given every year, all will be offered during the normal period of each student's curriculum. The term "Prerequisite" indicates a course must be completed with a passing grade before a student will be permitted to register for an advanced course to which it applies. The term "Preparation" indicates a course of such a preparatory nature that students undertaking an advanced course without having had the Preparation course specified will ordinarily find themselves greatly handicapped and may not register in the advanced course without the consent of the Dean of the college involved.

A credit hour equals three clock hours of work: ordinarily one hour of class and two hours of preparation a week for a term of ten weeks. Credit hours can be converted to standard semester hours by multiplying by ten-sixteenths, the ratio of the number of weeks in the term to the usual number of weeks in the semester. Courses not included in the specified curricula may be taken only after the approval of the student's faculty adviser. Except where otherwise indicated, electives are not open to freshmen.

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

| *Course No.* | *Course* | *Pre-requisite* | *Prep-aration* | *Class* | *Lab.* | *Prep.* | *Credit* |
|---|---|---|---|---|---|---|---|
| | | | *Accounting* | | | | |
| 41-01 | Introduction to Accounting | — | — | 2 | 2 | 8 | 4 |
| 41-02 | Prin. of Accounting | — | 41-01 | 2 | 2 | 8 | 4 |
| 41-03 | Prin. of Accounting | 41-02 | — | 2 | 2 | 8 | 4 |
| 41-04 | Intermediate Accounting | 41-03 | — | 2 | 2 | 8 | 4 |
| 41-05 | Intermediate Accounting | 41-04 | — | 2 | 2 | 8 | 4 |
| 41-06 | Construction Costs | — | — | 3 | 3 | 6 | 4 |
| 41-07 | Theory of Accounts | — | — | 4 | 0 | 8 | 4 |
| 41-08 | Elements of Cost Accounting | 41-07 | — | 2 | 2 | 5 | 3 |
| 41-09 | Elements of Cost Accounting | 41-08 | — | 2 | 2 | 5 | 3 |
| 41-11 | Cost Accounting | 41-05 | — | 3 | 3 | 9 | 5 |
| 41-12 | Cost Accounting | 41-11 | — | 3 | 3 | 9 | 5 |
| 41-15 | Trust Accounting | 41-05 | — | 2 | 4 | 6 | 4 |
| *41-21 | Problems in Accounting | 41-12 | — | 5 | 5 | 11 | 3½ |
| 41-22 | Accounting Problems | 41-05 | — | 2 | 4 | 6 | 4 |
| *41-23 | Accounting Problems | 41-22 | — | 0 | 9 | 9 | 3 |
| 41-24 | C.P.A. Problems | 41-23 | — | 2 | 2 | 5 | 3 |
| 41-25 | C.P.A. Problems | 41-24 | — | 2 | 2 | 5 | 3 |
| 41-26 | Auditing | 41-23 | — | 2 | 2 | 5 | 3 |

*Summer term — 5 weeks.

## Biology

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| 10-01 | General Zoology | — | — | 2 | 3 | 4 | 3 |
| 10-02 | General Zoology | — | 10-01 | 2 | 3 | 4 | 3 |
| 10-03 | General Botany | — | — | 2 | 3 | 4 | 3 |
| *10-04 | General Botany | — | 10-03 | 3 | 3 | 6 | 2 |
| †10-07 | Morphology of Thallophytes | 10-04 | — | 2 | 6 | 4 | 4 |
| †10-08 | Morphology of Bryophytes and Pteridophytes | — | 10-07 | 2 | 6 | 4 | 4 |
| †10-09 | Morphology of Spermatophytes | — | 10-08 | 2 | 6 | 4 | 4 |
| 10-10 | General Biology | — | — | 3 | 0 | 6 | 3 |
| 10-20 | General Bacteriology | 11-27<br>10-02 10-04 | — | 2 | 6 | 4 | 4 |
| 10-21 | General Bacteriology | — | 10-20 | 2 | 6 | 4 | 4 |
| †10-22 | Advanced Bacteriology | 10-21 | — | 2 | 6 | 4 | 4 |
| †10-23 | Advanced Bacteriology | — | 10-22 | 2 | 6 | 4 | 4 |
| 10-40 | Animal Physiology | 10-56 | — | 4 | — | 8 | 4 |
| 10-41 | Animal Physiology | — | 10-40 | 4 | 0 | 8 | 4 |
| †10-42 | Advanced Physiology | 10-41 11-27 | — | 4 | 0 | 8 | 4 |
| †10-43 | Advanced Physiology | — | 10-42 | 4 | 0 | 8 | 4 |
| 10-44 | Nutrition | — | — | 4 | 0 | 8 | 4 |
| 10-45 | Nutrition | — | 10-44 | 4 | 0 | 8 | 4 |
| †10-46 | Advanced Nutrition | 10-45 | — | 4 | 0 | 8 | 4 |
| †10-47 | Advanced Nutrition | — | 10-46 | 4 | 0 | 8 | 4 |
| 10-55 | Vertebrate Zoology | 10-02 | — | 2 | 6 | 4 | 4 |
| 10-56 | Vertebrate Zoology | — | 10-55 | 2 | 6 | 4 | 4 |
| †10-57 | Invertebrate Zoology | 10-02 | — | 2 | 6 | 4 | 4 |
| †10-58 | Invertebrate Zoology | — | 10-57 | 2 | 6 | 4 | 4 |
| 10-59 | Animal Histology | 10-56 10-58 | — | 2 | 6 | 4 | 4 |
| 10-60 | Animal Histology | — | 10-59 | 2 | 6 | 4 | 4 |
| †10-61 | Vertebrate Embryology | 10-56 | — | 2 | 6 | 4 | 4 |
| †10-62 | Vertebrate Embryology | — | 10-61 | 2 | 6 | 4 | 4 |
| 10-63 | General Parasitology | 10-58 | — | 2 | 6 | 4 | 4 |
| 10-64 | General Parasitology | — | 10-63 | 2 | 6 | 4 | 4 |
| 10-65 | Principles of Genetics | 10-02 10-04 | — | 4 | 0 | 8 | 4 |
| 10-66 | Principles of Genetics | — | 10-65 | 4 | 0 | 8 | 4 |
| †10-67 | Mammalian Anatomy | 10-56 | — | 1 | 8 | 3 | 4 |
| †10-68 | Mammalian Anatomy | — | 10-67 | 1 | 8 | 3 | 4 |
| †10-69 | Histological Technique | 10-60 | — | 1 | 8 | 3 | 4 |
| †10-70 | Histological Technique | — | 10-69 | 1 | 8 | 3 | 4 |
| †10-71 | History of Biology | — | — | 4 | 0 | 8 | 4 |
| †10-72 | History of Biology | — | 10-71 | 4 | 0 | 8 | 4 |
| †10-73 | General Entomology | 10-02 | — | 2 | 6 | 4 | 4 |
| †10-74 | Economic Entomology | — | 10-73 | 2 | 6 | 4 | 4 |
| 10-75 | Seminar in Zoology | — | — | | | | |
| 10-76 | Seminar in Zoology | — | 10-75 | | | | |
| ‡10-106 | Parasitic Protozoa | 10-64 | — | 2 | 6 | 4 | 4 |
| ‡10-107 | Helminthology | 10-106 | — | 2 | 6 | 4 | 4 |
| ‡10-108 | Sanitary Entomology | 10-74 | — | 2 | 6 | 4 | 4 |
| ‡10-109 | Advanced Histology | 10-70 | — | 2 | 6 | 4 | 4 |
| ‡10-110 | Advanced Histology | — | 10-109 | 2 | 6 | 4 | 4 |
| ‡10-111 | Research in Zoology | — | — | | | | |
| ‡10-112 | Research in Zoology | — | 10-111 | | | | |
| ‡10-113 | Thesis | — | — | | | | |
| ‡10-114 | Thesis | — | 10-113 | | | | |
| ‡10-115 | Reading and Conference | — | — | | | | |
| ‡10-116 | Reading and Conference | — | — | | | | |

*Summer term — 5 weeks.
†May be taken for graduate credit.
‡These courses are for graduate credit only.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Business Law** | | | | | | |
| *46-01 | Business Law I — Contracts | — | — | 8 | 0 | 13 | 3½ |
| *46-02 | Business Law II — Negotiable Instrum. | 46-01 | — | 9 | 0 | 15 | 4 |
| *46-03 | Contracts and Agency | — | — | 6 | 0 | 12 | 3 |
| 46-11 | Business Law III. Personal Property & Sales | 46-01 | — | 3 | 0 | 6 | 3 |
| 46-12 | Business Law IV. Agency | 46-01 | — | 3 | 0 | 6 | 3 |
| 46-21 | Income Tax Law | 41-05 46-01 | — | 2 | 2 | 5 | 3 |
| | **Business Management** | | | | | | |
| 45-01 | Industrial Management | — | — | 4 | 0 | 8 | 4 |
| 45-02 | Industrial Management | 45-01 | — | 4 | 0 | 8 | 4 |
| 45-03 | Business Machines | — | — | 0 | 3 | 0 | 1 |
| 45-04 | Business Machines | 45-03 | — | 0 | 3 | 0 | 1 |
| 45-21 | Public Administration | — | 45-02 | 4 | 0 | 8 | 4 |
| 45-22 | Public Administration | 45-21 | — | 4 | 0 | 8 | 4 |
| 45-23 | Traffic Management | 45-02 | — | 2 | 2 | 5 | 3 |
| 45-24 | Advanced Management | 45-02 | — | 2 | 2 | 5 | 3 |
| 45-25 | Purchasing & Procurement | 45-02 | — | 2 | 2 | 5 | 3 |
| 45-31 | Business & Government | — | 20-18 | 4 | 0 | 8 | 4 |
| 45-32 | Business Policy | 45-31 | — | 4 | 0 | 8 | 4 |
| | **Chemistry** | | | | | | |
| 11-01 | General Chemistry | — | — | 3 | 3 | 6 | 4 |
| 11-02 | General Chemistry | — | 11-01 | 3 | 3 | 6 | 4 |
| 11-03 | General Chemistry | — | 11-02 | 3 | 3 | 6 | 4 |
| *11-04 | General Chemistry | — | 11-03 | 3 | 3 | 6 | 2 |
| 11-09 | Adv. Inorganic Chemistry | — | 11-32 | 3 | 0 | 6 | 3 |
| 11-11 | Qualitative Analysis | 11-04 | — | 3 | 10 | 5 | 6 |
| 11-12 | Quantitative Analysis | — | 11-11 | 4 | 6 | 8 | 6 |
| 11-13 | Quantitative Analysis | — | 11-12 | 3 | 9 | 6 | 6 |
| 11-14 | Quantitative Analysis | — | 11-12 | 3 | 6 | 6 | 5 |
| 11-15 | Instrumental Analysis | — | 11-13 | 2 | 6 | 4 | 4 |
| 11-20 | Organic Chemistry | — | 11-13 or 11-14 | 3 | 6 | 6 | 5 |
| 11-21 | Organic Chemistry | — | 11-20 | 3 | 6 | 6 | 5 |
| 11-22 | Organic Chemistry | — | 11-21 | 3 | 0 | 6 | 3 |
| 11-23 | Organic Analysis Laboratory | — | 11-21 | 0 | 9 | 0 | 3 |
| 11-24 | Organic Chemistry | — | 11-23 | 3 | 6 | 6 | 5 |
| 11-25 | Organic Analysis Laboratory | — | 11-21 | 0 | 6 | 0 | 2 |
| 11-26 | Organic Chemistry | — | 11-04 | 5 | 6 | 10 | 7 |
| 11-27 | Organic Chemistry | — | 11-26 | 5 | 6 | 10 | 7 |
| 11-28 | Biological Chemistry | — | 11-27 or 11-22 | 3 | 6 | 3 | 4 |
| 11-29 | Biological Chemistry | — | 11-28 | 3 | 6 | 3 | 4 |
| 11-30 | Physical Chemistry | 11-12 | 11-13 | 4 | 3 | 8 | 5 |
| 11-31 | Physical Chemistry | — | 11-30 | 4 | 4 | 7 | 5 |
| 11-32 | Physical Chemistry | — | 11-31 | 4 | 4 | 7 | 5 |
| 11-33 | Physical Chemistry | — | 11-30 | 4 | 2 | 6 | 4 |
| 11-34 | Physical Chemistry | — | 11-33 | 4 | 2 | 6 | 4 |
| 11-35 | Thermodynamics | — | 11-32 | 3 | 0 | 6 | 3 |
| 11-40 | Colloid Chemistry | — | 11-32 | 3 | 3 | 6 | 4 |
| 11-41 | Chemical Literature | — | 11-04 | 1 | 0 | 2 | 1 |
| 11-42 | History of Chemistry | — | 11-32 | 2 | 0 | 4 | 2 |
| 11-43 | Thesis | — | 11-32 | 0 | 9 | 0 | 3 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | *Chemistry — Continued* | | | | | | |
| 11-44 | Thesis | — | 11-32 | 0 | 9 | 0 | 3 |
| ‡11-100 | Advanced Physical Chemistry | — | — | 3 | 0 | 6 | 3 |
| ‡11-101 | Advanced Physical Chemistry | — | 11-100 | 3 | 0 | 6 | 3 |
| ‡11-102 | Advanced Physical Chemistry | — | 11-101 | 3 | 0 | 6 | 3 |
| ‡11-103 | Advanced Organic Chemistry | — | — | 3 | 0 | 6 | 3 |
| ‡11-104 | Advanced Organic Chemistry | — | 11-103 | 3 | 0 | 6 | 3 |
| ‡11-105 | Advanced Organic Chemistry | — | 11-104 | 3 | 0 | 6 | 3 |
| ‡11-106 | Advanced Organic Chemistry | — | 11-105 | 3 | 0 | 6 | 3 |
| ‡11-107 | Thesis | — | — | To be arranged | | | 1 |
| ‡11-108 | Thesis | — | 11-107 | To be arranged | | | 1 |
| ‡11-109 | Thesis | — | 11-108 | To be arranged | | | 3 |
| ‡11-110 | Thesis | — | 11-109 | To be arranged | | | 3 |
| ‡11-111 | Thesis | — | 11-110 | To be arranged | | | 3 |
| | *Chemical Engineering* | | | | | | |
| * 4-01 | Flow of Fluids | 14-03 | — | 5 | 3 | 16 | 4 |
| 4-02 | Chemical Engineering Calculations | 11-12 | — | 2 | 0 | 4 | 2 |
| 4-03 | Chemical Engineering Thermodynamics | 2-32 | — | 4 | 0 | 8 | 4 |
| 4-11 | Unit Operations | 4-01 4-02 | — | 4 | 4 | 10 | 6 |
| 4-12 | Unit Operations | 4-01 4-02 | — | 4 | 4 | 10 | 6 |
| * 4-13 | Unit Operations | 4-01 4-02 | — | 3 | 6 | 9 | 3 |
| 4-21 | Chemical Plants | 11-20 | — | 4 | 0 | 8 | 4 |
| * 4-22 | Chemical Engineering Economics | 20-21 | — | 6 | 0 | 12 | 3 |
| 4-23 | Engineering Materials | 11-14 | — | 3 | 4 | 8 | 5 |
| 4-31 | Chemical Process Developments | 4-12 4-11 | — | 2 | 6 | 4 | 4 |
| 4-32 | Chemical Engineering Design | 4-11 4-12 | — | 2 | 7 | 9 | 6 |
| | *Civil Engineering* | | | | | | |
| 1-10 | Surveying | 14-03 | — | 4 | 3 | 5 | 4 |
| 1-11 | Surveying | 1-10 | — | 4 | 3 | 5 | 4 |
| 1-12 | Surveying | — | 1-11 | 4 | 3 | 5 | 4 |
| * 1-13 | Surveying | 1-12 | 1-12 | 0 | 18 | 0 | 3 |
| 1-20 | Hydraulics | 2-20 | 2-21 | 3 | 0 | 6 | 3 |
| 1-21 | Hydraulics | 1-20 | 1-20 | 3 | 0 | 6 | 3 |
| 1-24 | Sanitary Engineering | 1-21 | — | 3 | 0 | 6 | 3 |
| 1-25 | Sanitary Engineering | — | 1-24 | 3 | 3 | 6 | 4 |
| 1-30 | Transportation | 1-11 | — | 4 | 0 | 5 | 3 |
| 1-31 | Transportation | — | 1-30 | 2 | 0 | 4 | 2 |
| 1-40 | Structural Analysis | 2-22 | 2-22 | 3 | 0 | 6 | 3 |
| 1-41 | Structural Analysis | — | 1-40 | 4 | 0 | 8 | 4 |
| 1-42 | Structural Analysis | 1-41 | 1-41 | 3 | 0 | 6 | 3 |
| 1-43 | Structural Analysis | — | 1-42 | 4 | 0 | 8 | 4 |
| 1-46 | Structures | 2-23 | — | 3 | 0 | 6 | 3 |
| 1-47 | Structures | — | 1-47 | 3 | 0 | 6 | 3 |
| 1-49 | Concrete Testing Laboratory | — | 2-22 | 1 | 4 | 4 | 3 |
| 1-50 | Concrete | 2-22 | 2-23&1-49 | 3 | 0 | 6 | 3 |
| 1-51 | Concrete | 1-50 | 1-50 | 3 | 0 | 6 | 3 |
| 1-54 | Design of Structures | 2-22 | — | 2 | 4 | 0 | 2 |
| 1-55 | Design of Structures | 1-54 1-50 | 1-54 1-50 | 3 | 6 | 0 | 3 |
| 1-56 | Design of Structures | — | 1-55 | 0 | 9 | 0 | 3 |
| 1-57 | Foundation Engineering | — | — | 2 | 0 | 4 | 2 |

*Summer term — 5 weeks.
‡These courses are for graduate credit only.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Co-ordination** | | | | | | |
| 50-01 | Professional Development | — | — | 3 | 0 | 6 | 3 |
| *50-01 | Professional Development | — | — | 6 | 0 | 12 | 3 |
| | **Drawing and Graphic Arts** | | | | | | |
| 12-01 | Engineering Drawing | — | — | 0 | 6 | 3 | 3 |
| 12-02 | Engineering Drawing | 12-01 | — | 0 | 6 | 3 | 3 |
| 12-03 | Descriptive Geometry | — | 12-01&12-02 | 0 | 6 | 3 | 3 |
| *12-04 | Machine Drawing | 12-01&12-02 | — | 0 | 9 | 3 | 2 |
| 12-05 | Technical Drawing | — | — | 3 | 6 | 9 | 3 |
| | **Economics** | | | | | | |
| 20-01 | Economic Geography | — | — | 3 | 0 | 6 | 3 |
| 20-02 | Economic Geography | — | 20-02 | 3 | 0 | 6 | 3 |
| 20-03 | Economic Geography | — | 20-03 | 3 | 0 | 6 | 3 |
| 20-05 | Economic Geography | — | — | 4 | 0 | 8 | 4 |
| 20-06 | Current Economic Problems | — | — | 3 | 0 | 6 | 3 |
| 20-07 | International Economic Relations | — | — | 3 | 0 | 6 | 3 |
| 20-08 | Labor Problems | — | — | 3 | 0 | 6 | 3 |
| 20-11 | Economics | — | — | 3 | 0 | 6 | 3 |
| 20-12 | Economics | — | 20-11 | 3 | 0 | 6 | 3 |
| 20-13 | Economic Principles | — | 20-03 B.A.<br>20-05 L.A. | 4 | 0 | 8 | 4 |
| 20-14 | Economic Problems | — | 20-13 | 4 | 0 | 8 | 4 |
| 20-15 | Economic Problems | — | 20-14 | 4 | 0 | 8 | 4 |
| 20-16 | Principles of Accounting | — | — | 3 | 2 | 7 | 4 |
| 20-17 | Principles of Accounting | — | 20-16 | 3 | 2 | 7 | 4 |
| 20-18 | American Economic History | — | 20-15 B.A.<br>20-11 or<br>20-13 L.A. | 4 | 0 | 8 | 4 |
| 20-20 | Statistics | — | — | 3 | 2 | 7 | 4 |
| 20-21 | Statistics | — | 20-20 | 3 | 2 | 7 | 4 |
| 20-22 | Industrial Statistics I | — | — | 2 | 2 | 5 | 3 |
| 20-23 | Industrial Statistics II | — | 20-22 | 2 | 2 | 5 | 3 |
| 20-24 | Money and Banking | 20-15 | — | 4 | 0 | 8 | 4 |
| 20-25 | Business Cycles | — | 20-14 | 4 | 0 | 8 | 4 |
| 20-26 | Labor Economics | — | 20-14 | 4 | 0 | 8 | 4 |
| 20-27 | International Economic Relations | — | 20-15 | 3 | 0 | 6 | 1½ |
| 20-28 | Economic Systems | 20-15L.A. | 20-15B.A. | 4 | 0 | 8 | 4 |
| 20-31 | History of Economic Thought | — | 20-15 | 4 | 0 | 8 | 4 |
| 20-32 | Advanced Economic Theory | — | 20-31 | 4 | 0 | 8 | 4 |
| 20-61 | Seminar | — | — | | | | 4 |
| 20-62 | Seminar | — | 20-61 | | | | 4 |
| | **Education** | | | | | | |
| 21-01 | History of Education | — | — | 4 | 0 | 8 | 4 |
| 21-02 | History of Education | — | — | 4 | 0 | 8 | 4 |
| 21-03 | Educational Measurements | — | — | 4 | 0 | 8 | 4 |
| 21-04 | Educational Organization and Administration | — | — | 4 | 0 | 8 | 4 |
| 21-05 | Comparative Education | — | — | 4 | 0 | 8 | 4 |
| 21-06 | Educational Sociology | — | — | 4 | 0 | 8 | 4 |
| 21-07 | Educational Philosophy | — | — | 4 | 0 | 8 | 4 |
| 21-08 | Principles of Secondary Education | — | — | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Education — Continued** | | | | | | |
| 21-09 | Methods of Teaching in Secondary Schools | — | — | 4 | 0 | 8 | 4 |
| | **Electrical Engineering** | | | | | | |
| 3-01 | Electrical Engineering I | 15-03 or 15-04 | — | 3 | 0 | 6 | 3 |
| 3-02 | Electrical Engineering I | — | 3-01 | 3 | 0 | 6 | 3 |
| 3-03 | Electrical Measurements | 3-01 3-02 | — | 2 | 2 | 5 | 3 |
| 3-04 | Electrical Engineering | 14-07 or 15-03 or 15-04 | — | 4 | 3 | 8 | 5 |
| 3-10 | Direct Current Machinery | 3-01 | — | 5 | 0 | 7 | 4 |
| 3-11 | Adv. Alternating Current Circuit Theory | 3-02 | — | 3 | 0 | 6 | 3 |
| 3-12 | Elec. Eng. Lab., Direct Current | 3-10 | — | 1 | 3 | 2 | 2 |
| 3-13 | Electrical Measurements | — | 3-01&3-02 | 3 | 0 | 6 | 3 |
| * 3-14 | Elec. Eng. Lab., Direct Current | 3-10 | — | 2 | 6 | 10 | 3 |
| 3-15 | Polyphase Alternating Current Circuits | 3-11 | — | 3 | 0 | 6 | 3 |
| 3-16 | Electronics | — | 15-03&15-04 | 3 | 0 | 6 | 3 |
| 3-17 | Electrical Measurements | — | 3-13 | 4 | 0 | 5 | 3 |
| 3-18 | Electrical Measurements Lab. | — | 3-13 | 0 | 3 | 6 | 3 |
| 3-19 | Electric Field Theory | 3-11 or 14-07 | — | 3 | 0 | 6 | 3 |
| 3-20 | Transformer Theory | 3-12 | — | 3 | 0 | 6 | 3 |
| 3-21 | Electronics | — | 3-16 | 3 | 0 | 6 | 3 |
| 3-22 | Alternating Current Test Lab. | — | 3-15 | 1 | 3 | 5 | 3 |
| 3-23 | Electronics Laboratory | — | 3-16 | 1 | 3 | 5 | 3 |
| * 3-24 | Electronics Laboratory | — | 3-21 or 3-11 3-17 | 2 | 6 | 10 | 3 |
| * 3-25 | Adv. Measurements Laboratory | — | 3-18 & 3-13 or 3-17 & 3-11 | 0 | 6 | 12 | 3 |
| 3-26 | Synchronous Machinery | — | 3-20 | 3 | 0 | 6 | 3 |
| 3-27 | High-Frequency Engineering | 3-16 3-21 | — | 3 | 0 | 6 | 3 |
| 3-28 | Transmission Lines and Networks | — | 14-07 | 3 | 0 | 6 | 3 |
| 3-29 | Advanced Field Theory | 3-19 | — | 3 | 0 | 6 | 3 |
| 3-30 | Induction Machinery | — | 3-26 | 3 | 0 | 6 | 3 |
| 3-31 | High-Frequency Engineering | 3-27 | — | 3 | 0 | 6 | 3 |
| 3-32 | Filters | — | 3-28 | 3 | 0 | 6 | 3 |
| 3-33 | High-Frequency Laboratory | — | 3-19 & 3-29 or 3-28 & 3-27 | 1 | 3 | 5 | 3 |
| 3-34 | Adv. Electrical Eng. Lab. | — | 3-26 | 1 | 3 | 5 | 3 |
| | **English** | | | | | | |
| 30-01 | English I | — | — | 3 | 0 | 6 | 3 |
| 30-02 | English I | — | 30-01 | 3 | 0 | 6 | 3 |
| 30-03 | English I | — | 30-02 | 3 | 0 | 6 | 3 |
| *30-04 | Introduction to Literature | — | 30-03 | 5 | 0 | 10 | 2½ |
| 30-05 | Public Speaking | — | — | 4 | 0 | 5 | 3 |
| 30-06 | Public Speaking | — | 30-05 | 4 | 0 | 5 | 3 |
| *30-07 | Effective Speaking | — | — | 6 | 0 | 12 | 3 |
| 30-07 | Effective Speaking | — | — | 3 | 0 | 6 | 3 |
| 30-08 | Business Communication | — | 30-04 | 5 | 4 | 9 | 3 |
| 30-09 | Report Writing | — | — | 3 | 0 | 6 | 3 |
| 30-10 | Problems in Writing | — | — | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | *English — Continued* | | | | | | |
| 30-11 | Shakespeare | — | — | 3 | 0 | 6 | 3 |
| 30-12 | Great European Writers | — | — | 3 | 0 | 6 | 3 |
| 30-14 | Contemporary Drama | — | — | 3 | 0 | 6 | 3 |
| 30-15 | Contemporary Novel | — | — | 3 | 0 | 6 | 3 |
| 30-21 | Advanced Composition | — | 30-03 | 4 | 0 | 8 | 4 |
| 30-22 | Advanced Composition | — | 30-21 | 4 | 0 | 8 | 4 |
| 30-23 | Creative Writing | — | 30-22 | 4 | 0 | 8 | 4 |
| 30-24 | Creative Writing | — | 30-23 | 4 | 0 | 8 | 4 |
| 30-29 | Foundations of the English Lang. | — | — | 4 | 0 | 8 | 4 |
| 30-30 | Foundations of the English Lang. | — | 30-29 | 4 | 0 | 8 | 4 |
| 30-31 | Western World Literature | — | — | 4 | 0 | 8 | 4 |
| 30-32 | Western World Literature | — | 30-31 | 4 | 0 | 8 | 4 |
| 30-33 | Survey of English Literature | — | — | 4 | 0 | 8 | 4 |
| 30-34 | Survey of English Literature | — | — | 4 | 0 | 8 | 4 |
| 30-35 | American Literature to 1860 | — | — | 4 | 0 | 8 | 4 |
| 30-36 | American Literature after 1860 | — | 30-35 | 4 | 0 | 8 | 4 |
| 30-37 | Saxon and Anglo-Norman Lit. | — | — | 4 | 0 | 8 | 4 |
| 30-38 | English Lit. from 1200 to 1600 | — | — | 4 | 0 | 8 | 4 |
| 30-39 | 19th Century in England | — | — | 4 | 0 | 8 | 4 |
| 30-40 | 17th Century in England | — | 30-39 | 4 | 0 | 8 | 4 |
| 30-41 | 18th Century in England | — | — | 4 | 0 | 8 | 4 |
| 30-42 | 18th Century in England | — | 30-41 | 4 | 0 | 8 | 4 |
| 30-43 | 19th Century Prose | — | — | 4 | 0 | 8 | 4 |
| 30-44 | 19th Century Prose | — | 30-43 | 4 | 0 | 8 | 4 |
| 30-45 | 19th Century Poetry | — | — | 4 | 0 | 8 | 4 |
| 30-46 | 19th Century Poetry | — | — | 4 | 0 | 8 | 4 |
| 30-47 | The Modern Novel | — | — | 4 | 0 | 8 | 4 |
| 30-48 | The Modern Drama | — | — | 4 | 0 | 8 | 4 |
| 30-49 | Modern Poetry | — | — | 4 | 0 | 8 | 4 |
| 30-51 | Introduction to Journalism | — | — | 4 | 0 | 8 | 4 |
| 30-52 | Introduction to Journalism | — | 30-51 | 4 | 0 | 8 | 4 |
| 30-53 | Techniques of Journalism | — | 30-52 | 4 | 0 | 8 | 4 |
| 30-54 | Techniques of Journalism | — | 30-53 | 4 | 0 | 8 | 4 |
| 30-61 | Shakespeare | — | — | 4 | 0 | 8 | 4 |
| 30-62 | Shakespeare | — | 30-61 | 4 | 0 | 8 | 4 |
| 30-63 | Chaucer | — | — | 4 | 0 | 8 | 4 |
| 30-64 | Chaucer | — | 30-63 | 4 | 0 | 8 | 4 |
| 30-71 | Seminar | — | — | — | — | — | 4 |
| 30-72 | Seminar | — | 30-71 | — | — | — | 4 |
| | *Finance and Insurance* | | | | | | |
| 44-01 | Principles of Banking | — | — | 3 | 0 | 6 | 3 |
| 44-02 | Principles of Insurance | — | — | 3 | 0 | 6 | 3 |
| 44-11 | Business Finance | — | 44-01 | 4 | 0 | 8 | 4 |
| 44-12 | Business Finance | 44-11 | — | 4 | 0 | 8 | 4 |
| 44-13 | Construction Finance | — | — | 3 | 0 | 6 | 3 |
| 44-14 | Industrial Finance | — | — | 3 | 0 | 6 | 3 |
| 44-21 | Real Estate | 44-12 | — | 6 | 0 | 12 | 3 |
| 44-22 | Investments | 44-12 | — | 2 | 2 | 5 | 3 |
| 44-23 | Investments | 44-22 | — | 2 | 2 | 5 | 3 |
| 44-24 | Probs. in Finance & Insurance | 44-12 | — | 2 | 2 | 5 | 3 |
| 44-25 | Public Finance | 44-12 | — | 2 | 2 | 5 | 3 |
| | *French* | | | | | | |
| 31-01 | Elementary French | — | — | 3 | 0 | 6 | 3 |
| 31-02 | Elementary French | — | 31-01 | 3 | 0 | 6 | 3 |
| 31-03 | Elementary French | — | 31-02 | 3 | 0 | 6 | 3 |
| *31-04 | Elementary French | — | 31-03 | 3 | 0 | 6 | 1½ |

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **French — Continued** | | | | | | |
| 31-05 | Introduction to French | — | — | 3 | 0 | 6 | 3 |
| 31-06 | Introduction to French | — | — | 3 | 0 | 6 | 3 |
| 31-07 | Introduction to French | — | — | 3 | 0 | 6 | 3 |
| 31-08 | Introduction to French | — | — | 3 | 0 | 6 | 3 |
| 31-11 | Introduction to French Lit. | — | 31-04 or 2 yrs. of H.S. | 3 | 0 | 6 | 3 |
| 31-12 | Introduction to French Lit. | — | 31-11 | 3 | 0 | 6 | 3 |
| 31-13 | Introduction to French Lit. | — | 31-12 | 3 | 0 | 6 | 3 |
| *31-14 | Introduction to French Lit. | — | 31-13 | 3 | 0 | 6 | 1½ |
| 31-15 | Intermediate French | — | 31-04 | 4 | 0 | 8 | 4 |
| 31-16 | Intermediate French | — | 31-15 | 4 | 0 | 8 | 4 |
| 31-21 | Modern French Literature | — | 31-14 or 31-16 | 4 | 0 | 8 | 4 |
| 31-22 | Modern French Literature | — | 31-21 | 4 | 0 | 8 | 4 |
| 31-23 | French Classicism | — | 31-14 or 31-16 | 4 | 0 | 8 | 4 |
| 31-24 | French Classicism | — | 31-23 | 4 | 0 | 8 | 4 |
| 31-25 | French Romanticism | — | 31-14 or 31-16 | 4 | 0 | 8 | 4 |
| 31-26 | French Romanticism | — | 31-25 | 4 | 0 | 8 | 4 |
| 31-31 | Advanced Comp. & Convers'n | — | 31-22 or 31-24 or 31-16 | 4 | 0 | 8 | 4 |
| 31-32 | Advanced Comp. & Convers'n | — | 31-31 | 4 | 0 | 8 | 4 |
| | **Geology** | | | | | | |
| 13-01 | General Geology | — | — | 3 | 0 | 6 | 3 |
| 13-02 | General Geology | — | 13-01 | 3 | 0 | 6 | 3 |
| 13-03 | Historical Geology | — | — | 4 | 0 | 8 | 4 |
| 13-04 | Historical Geology | — | 13-03 | 4 | 0 | 8 | 4 |
| 13-11 | Engineering Geology | — | 13-01 | 3 | 0 | 6 | 3 |
| | **German** | | | | | | |
| 32-01 | Elementary German | — | — | 3 | 0 | 6 | 3 |
| 32-02 | Elementary German | — | 32-01 | 3 | 0 | 6 | 3 |
| 32-01A | Elementary German | — | — | 5 | 0 | 8 | 4 |
| 32-02A | Elementary German | — | — | 5 | 0 | 8 | 4 |
| 32-03 | Elementary German | — | 32-02 | 3 | 0 | 6 | 3 |
| *32-04 | Elementary German | — | 32-03 | 3 | 0 | — | 1½ |
| 32-05 | Introduction to German | — | — | 3 | 0 | 6 | 3 |
| 32-06 | Introduction to German | — | — | 3 | 0 | 6 | 3 |
| 32-07 | Introduction to German | — | — | 3 | 0 | 6 | 3 |
| 32-08 | Introduction to German | — | — | 3 | 0 | 6 | 3 |
| 32-11 | Introduction to German Lit. | — | 32-04 or 2 yrs of H.S. | 3 | 0 | 6 | 3 |
| 32-12 | Introduction to German Lit. | — | 32-11 | 3 | 0 | 6 | 3 |
| 32-13 | Introduction to German Lit. | — | 32-12 | 3 | 0 | 6 | 3 |
| *32-14 | Introduction to German Lit. | — | 32-13 | 3 | 0 | 6 | 1½ |
| 32-15 | Intermediate German | — | 32-04 | 4 | 0 | 8 | 4 |
| 32-16 | Intermediate German | — | 32-15 | 4 | 0 | 8 | 4 |
| 32-21 | Modern German Literature | — | 32-14 or 32-16 | 4 | 0 | 8 | 4 |
| 32-22 | Modern German Literature | — | 32-21 | 4 | 0 | 8 | 4 |
| 32-23 | Classical Period of German Lit. | — | 32-14 or 32-16 | 4 | 0 | 8 | 4 |
| 32-24 | Classical Period of German Lit. | — | 32-23 | 4 | 0 | 8 | 4 |
| 32-25 | German Lit. of the 19th Cent. | — | 32-14 or 31-16 | 4 | 0 | 8 | 4 |
| 32-26 | German Lit. of the 19th Cent. | — | 32-25 | 4 | 0 | 8 | 4 |
| 32-31 | Adv. Comp. & Conversation | — | 32-22 or 32-24 or 32-26 | 4 | 0 | 8 | 4 |
| 32-32 | Adv. Comp. & Conversation | — | 32-31 | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Government** | | | | | | |
| 22-01 | American Govt. & Politics | — | — | 3 | 0 | 6 | 3 |
| 22-02 | American Govt. & Politics | — | 22-01 | 3 | 0 | 6 | 3 |
| 22-03 | American Govt. & Politics | — | 22-02 | 3 | 0 | 6 | 3 |
| *22-05 | American Government | — | — | 4 | 0 | 8 | 2 |
| 22-06 | Municipal Government | — | — | 3 | 0 | 6 | 3 |
| 22-07 | Government and Business | — | — | 3 | 0 | 6 | 3 |
| 22-11 | Comparative Government | — | — | 4 | 0 | 8 | 4 |
| 22-12 | Comparative Government | — | — | 4 | 0 | 8 | 4 |
| 22-13 | Origins of Political Theory | — | — | 4 | 0 | 8 | 4 |
| 22-14 | Modern Political Theory | — | — | 4 | 0 | 8 | 4 |
| 22-15 | American Constitutional Law | — | — | 4 | 0 | 8 | 4 |
| 22-16 | American Constitutional Law | — | 22-15 | 4 | 0 | 8 | 4 |
| 22-17 | International Law | — | 22-03 | 4 | 0 | 8 | 4 |
| 22-18 | International Relationships | — | 22-17 | 4 | 0 | 8 | 4 |
| 22-20 | Public Administration | — | 22-03 | 4 | 0 | 8 | 4 |
| 22-21 | Public Administration | — | 22-20 | 4 | 0 | 8 | 4 |
| | **History** | | | | | | |
| 23-01 | History of Civilization | — | — | 3 | 0 | 6 | 3 |
| 23-02 | History of Civilization | — | 23-01 | 3 | 0 | 6 | 3 |
| 23-03 | History of Civilization | — | 23-02 | 4 | 0 | 8 | 4 |
| *23-04 | History of Civilization | — | 23-03 | 4 | 0 | 8 | 4 |
| *23-05 | American History | — | — | 6 | 0 | 12 | 3 |
| 23-06 | Modern European History | — | — | 3 | 0 | 6 | 3 |
| 23-07 | History of Latin America | — | — | 3 | 0 | 6 | 3 |
| 23-08 | History of the Far East | — | — | 3 | 0 | 6 | 3 |
| 23-11 | Europe 1789–1870 | — | — | 4 | 0 | 8 | 4 |
| 23-12 | Europe 1870–1920 | — | 23-11 | 4 | 0 | 8 | 4 |
| 23-13 | England to 1688 | — | — | 4 | 0 | 8 | 4 |
| 23-14 | England since 1688 | — | 23-14 | 4 | 0 | 8 | 4 |
| 23-15 | English Constitutional History | — | — | 4 | 0 | 8 | 4 |
| 23-16 | American Constitutional History | — | — | 4 | 0 | 8 | 4 |
| 23-17 | The United States to 1865 | — | — | 4 | 0 | 8 | 4 |
| 23-18 | The United States since 1865 | — | 23-17 | 4 | 0 | 8 | 4 |
| 23-19 | Latin American History | — | — | 4 | 0 | 8 | 4 |
| 23-20 | Latin American History | — | 23-19 | 4 | 0 | 8 | 4 |
| 23-21 | Far Eastern International Relations 1840–1900 | — | — | 4 | 0 | 8 | 4 |
| 23-22 | Far Eastern International Relations since 1900 | — | 23-21 | 4 | 0 | 8 | 4 |
| 23-23 | Recent European History | — | 23-18 | 4 | 0 | 8 | 4 |
| 23-24 | History of Art I | — | — | 3 | 0 | 6 | 3 |
| 23-25 | History of Art II | — | — | 3 | 0 | 6 | 3 |
| 23-26 | History of Architecture | — | — | 3 | 0 | 6 | 3 |
| | **Industrial Engineering** | | | | | | |
| 5-10 | Industrial Management I | — | 2-50 | 3 | 0 | 6 | 3 |
| 5-11 | Industrial Management II | — | 5-10 | 2 | 0 | 4 | 2 |
| 5-15 | Methods Engineering I | — | 5-11 | 2 | 0 | 4 | 2 |
| 5-16 | Methods Engineering II | — | 5-15 | 2 | 2 | 5 | 3 |
| 5-17 | Production Planning & Control | — | 5-11, 5-15 desirable, 5-16 desirable | 3 | 0 | 6 | 3 |
| 5-18 | Quality Control | — | 20-22 | 3 | 0 | 6 | 3 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Industrial Relations** | | | | | | |
| 42-10 | Personnel | — | — | 3 | 0 | 6 | 3 |
| 42-11 | Personnel Administration | — | 45-02 | 4 | 0 | 8 | 4 |
| 42-12 | Personnel Administration | 42-11 | — | 4 | 0 | 8 | 4 |
| 42-13 | Wage Administration | 42-12 | — | 2 | 2 | 5 | 3 |
| 42-14 | Wage Administration | 42-13 | — | 2 | 2 | 5 | 3 |
| *42-16 | Testing | — | 25-02 | 5 | 5 | 11 | 3½ |
| 42-17 | Problems in Personnel | — | — | 3 | 0 | 6 | 3 |
| 42-22 | Industrial Relations Seminar | 42-14 | — | 2 | 2 | 5 | 3 |
| 42-23 | Industrial Relations Seminar | 42-22 | — | 2 | 2 | 5 | 3 |
| | **Marketing and Advertising** | | | | | | |
| 43-01 | Principles of Marketing | — | — | 3 | 0 | 6 | 3 |
| 43-02 | Principles of Advertising | — | — | 3 | 0 | 6 | 3 |
| 43-08 | Sales Engineering | — | — | 3 | 0 | 6 | 3 |
| *43-10 | Conference Leadership | — | — | 5 | 5 | 11 | 3½ |
| 43-11 | Sales Management | 43-02 | — | 3 | 3 | 9 | 5 |
| 43-12 | Sales Management | 43-11 | — | 3 | 3 | 9 | 5 |
| 43-13 | Problems in Advertising and Marketing | 43-12 | — | 0 | 6 | 6 | 4 |
| 43-14 | Problems in Advertising and Marketing | 43-13 | — | 0 | 6 | 6 | 4 |
| *43-15 | Advanced Probs., Adv. & Mktg | 43-14 | — | 0 | 9 | 9 | 3 |
| 43-21 | Merchandising | 43-12 | — | 2 | 2 | 5 | 3 |
| 43-22 | Merchandising | 43-21 | — | 2 | 2 | 5 | 3 |
| 43-23 | Store Management | 43-12 | — | 2 | 2 | 5 | 3 |
| 43-24 | Marketing Research | 43-12 | — | 3 | 0 | 6 | 3 |
| | **Mathematics** | | | | | | |
| 14-01 | College Algebra | — | — | 5 | 0 | 7 | 4 |
| 14-02 | Trigonometry | — | 14-01 | 5 | 0 | 7 | 4 |
| 14-03 | Analytic Geometry | — | 14-02 | 5 | 0 | 10 | 5 |
| *14-04 | Introduction to Calculus | — | 14-03 | 5 | 0 | 10 | 2½ |
| 14-05 | Differential Calculus | 14-01 | 14-04 | 4 | 0 | 8 | 4 |
| 14-06 | Integral Calculus | — | 14-05 | 4 | 0 | 8 | 4 |
| 14-07 | Differential Equations I | — | 14-06 | 3 | 0 | 6 | 3 |
| 14-08 | Differential Equations II | — | 14-07 | 4 | 0 | 8 | 4 |
| 14-10 | Analytic Mechanics | — | 14-07 | 4 | 0 | 8 | 4 |
| 14-11 | Curve Analysis | 14-05 | — | 4 | 0 | 8 | 4 |
| 14-12 | Modern Geometry | 14-03 | — | 4 | 0 | 8 | 4 |
| 14-13 | Spherical Trigonometry | 14-02 | — | 4 | 0 | 8 | 4 |
| 14-14 | History of Mathematics | — | 14-06 | 3 | 0 | 6 | 3 |
| 14-15 | Advanced Calculus | 14-06 | — | 4 | 0 | 8 | 4 |
| 14-16 | Advanced Calculus | — | 14-15 | 4 | 0 | 8 | 4 |
| 14-17 | Infinite Series | 14-06 | — | 4 | 0 | 8 | 4 |
| 14-18 | Theory of Equations | — | 14-06 | 4 | 0 | 8 | 4 |
| 14-20 | Special Topics in Math. | — | — | 4 | 0 | 8 | 4 |
| 14-21 | Basic Mathematics I | — | — | 3 | 0 | 6 | 3 |
| 14-22 | Basic Mathematics II | — | 14-21 | 3 | 0 | 6 | 3 |
| 14-23 | Basic Mathematics III | — | 14-22 | 3 | 0 | 6 | 3 |
| 14-25 | Mathematics in Finance | — | — | 4 | 0 | 8 | 4 |
| 14-28 | Mathematical Statistics | — | 14-06 | 4 | 0 | 8 | 4 |
| 14-29 | Math. Statistics & Probability | — | — | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Mechanical Engineering** | | | | | | |
| 2-10 | Mechanism | — | 2-21 | 0 | 6 | 6 | 4 |
| 2-11 | Machine Design | — | 2-24 | 0 | 6 | 3 | 3 |
| 2-12 | Machine Design | — | 2-11 | 0 | 9 | 6 | 5 |
| 2-20 | Applied Mechanics (Statics) | 15-02 | — | 4 | 0 | 8 | 4 |
| 2-21 | Applied Mechanics (Kinetics) | — | 2-20 | 3 | 0 | 6 | 3 |
| 2-22 | Strength of Materials | 2-20 | 2-21 | 4 | 0 | 8 | 4 |
| 2-23 | Strength of Materials | 2-22 | — | 3 | 0 | 6 | 3 |
| 2-24 | Advanced Mechanics | — | 2-23 | 3 | 0 | 6 | 3 |
| 2-25 | Aerodynamics | — | 2-21 & 1-21 | 3 | 0 | 6 | 3 |
| 2-26 | Engine Dynamics | — | 2-21 & 14-07 | 3 | 0 | 6 | 3 |
| * 2-30 | Heat Engineering (Power Plant Equip.) | — | — | 5 | 0 | 10 | 2½ |
| 2-31 | Heat Engineering (Thermo.) | — | 15-06 | 3 | 0 | 6 | 3 |
| 2-32 | Heat Engineering (Thermo.) | — | 15-06 | 4 | 0 | 8 | 4 |
| 2-33 | Heat Engineering | 2-32 | 2-30 | 3 | 0 | 6 | 3 |
| 2-34 | Heat Engineering | — | 2-32 | 3 | 0 | 6 | 3 |
| 2-35 | Heat Engineering | — | 2-33 | 4 | 0 | 8 | 4 |
| 2-36 | Heat Engineering (Steam Turb.) | — | 2-34 | 3 | 0 | 6 | 3 |
| * 2-37 | Heating & Air Conditioning | — | 2-32 | 6 | 0 | 12 | 3 |
| 2-38 | Power Plant Engineering | — | 2-34 | 4 | 0 | 8 | 4 |
| 2-40 | Materials | — | — | 2 | 0 | 4 | 2 |
| * 2-41 | Metallography | — | 2-50 & 2-40 | 4 | 4 | 10 | 3 |
| * 2-50 | Production Processes I | — | — | 5 | 0 | 10 | 2½ |
| 2-60 | Mechanical Engineering Lab. | — | 2-30 & 2-33 | 0 | 3 | 3 | 2 |
| 2-61 | Mechanical Engineering Lab. | — | 2-34 & 2-60 | 0 | 4 | 5 | 3 |
| 2-62 | Mechanical Engineering Lab. | — | 2-23 & 2-40 | 0 | 4 | 5 | 3 |
| 2-63 | Mechanical Engineering Lab. | — | 2-61 | 0 | 4 | 5 | 3 |
| 2-64 | Testing Materials Laboratory | — | 2-23 & 2-40 | 1 | 4 | 4 | 3 |
| 2-65 | Mechanical Engineering Lab. | — | 2-31 | 2 | 3 | 4 | 3 |
| *2-66 | Mechanical Engineering Lab. | — | 2-50 | 0 | 12 | 6 | 3 |
| | **Philosophy** | | | | | | |
| 24-01 | Introduction to Philosophy | — | — | 4 | 0 | 8 | 4 |
| 24-02 | Problems of Philosophy | — | 24-01 | 4 | 0 | 8 | 4 |
| 24-03 | History of Philosophy | — | — | 4 | 0 | 8 | 4 |
| 24-04 | History of Philosophy | — | — | 4 | 0 | 8 | 4 |
| 24-05 | Philosophy of Religion | — | — | 4 | 0 | 8 | 4 |
| 24-06 | Logic | — | — | 4 | 0 | 8 | 4 |
| 24-07 | Introduction to Philosophy | — | — | 3 | 0 | 6 | 3 |
| 24-08 | Problems of Philosophy | — | — | 3 | 0 | 6 | 3 |
| | **Physical Education** | | | | | | |
| 16-01 | Hygiene | — | — | 1 | 0 | 2 | 1 |
| 16-02 | Hygiene | — | 16-01 | 1 | 0 | 2 | 1 |
| 16-10 | Physical Training | — | — | 0 | 2 | 0 | 0 |
| 16-11 | Physical Training | — | 16-10 | 0 | 2 | 0 | 0 |
| 16-12 | Physical Training | — | 16-11 | 0 | 2 | 0 | 0 |
| 16-21 | Principles of Physical Education | — | — | 4 | 0 | 8 | 4 |
| 16-22 | Play and Recreation | — | — | 4 | 0 | 8 | 4 |
| 16-23 | History of Physical Education | — | — | 4 | 0 | 8 | 4 |
| 16-24 | Admin. of Physical Education | — | — | 4 | 0 | 8 | 4 |
| 16-25 | Football | — | — | 4 | 0 | 8 | 4 |
| 16-26 | Track & Field Events | — | — | 4 | 0 | 8 | 4 |
| 16-27 | Basketball & Baseball | — | — | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Physics** | | | | | | |
| 15-01 | Physics | — | — | 3 | 0 | 6 | 3 |
| 15-02 | Physics | — | 15-01 | 3 | 0 | 6 | 3 |
| 15-03 | Physics | — | 15-02 | 3 | 0 | 6 | 3 |
| *15-04 | Physics | — | 15-03 | 3 | 0 | 6 | 1½ |
| 15-05 | Physics | — | 15-04 | 3 | 3 | 6 | 4 |
| 15-06 | Physics | — | 15-04 | 3 | 3 | 6 | 4 |
| 15-07 | Survey of Physical Sciences | — | — | 3 | 0 | 6 | 3 |
| 15-08 | Survey of Physical Sciences | — | 15-07 | 3 | 0 | 6 | 3 |
| 15-09 | Survey of Physical Sciences | — | 15-08 | 3 | 0 | 6 | 3 |
| *15-10 | Survey of Physical Sciences | — | 15-09 | 4 | 0 | 8 | 2 |
| *15-11 | General Physics | — | 14-23 | 6 | 0 | 12 | 3 |
| 15-12 | General Physics | — | 15-11 | 3 | 3 | 9 | 5 |
| 15-13 | General Physics | — | 15-12 | 3 | 3 | 9 | 5 |
| 15-14 | Advanced Physics | — | 15-06 14-06 | 2 | 2 | 5 | 3 |
| 15-15 | Advanced Physics | — | 15-06 14-06 | 2 | 2 | 5 | 3 |
| 15-20 | Optics | 15-06 14-06 | — | 3 | 2 | 7 | 4 |
| 15-21 | Optics | — | 15-20 | 3 | 2 | 7 | 4 |
| 15-22 | Acoustics | 15-06 14-06 | — | 3 | 2 | 7 | 4 |
| 15-23 | Acoustics | — | 15-22 | 3 | 2 | 7 | 4 |
| 15-24 | Electronics | 15-06 14-06 | — | 3 | 2 | 7 | 4 |
| 15-25 | Electronics | — | 15-24 | 3 | 2 | 7 | 4 |
| 15-26 | Modern Physics | 15-06 14-06 | — | 3 | 2 | 7 | 4 |
| 15-27 | Modern Physics | — | 15-26 | 3 | 2 | 7 | 4 |
| 15-65 | Thesis | — | — | | | | |
| 15-66 | Thesis | — | 15-65 | | | | |
| ‡15-101 | Theoretical Physics | — | — | 4 | 0 | 8 | 4 |
| ‡15-102 | Theoretical Physics | — | 15-101 | 4 | 0 | 8 | 4 |
| ‡15-103 | Quantum Mechanics | — | — | 4 | 0 | 8 | 4 |
| ‡15-104 | Quantum Mechanics | — | 15-03 | 4 | 0 | 8 | 4 |
| ‡15-105 | Applied Mathematics | — | — | 4 | 0 | 8 | 4 |
| ‡15-107 | Graduate Thesis | — | — | | | | |
| ‡15-108 | Graduate Thesis | — | 15-07 | | | | |
| ‡15-109 | Graduate Thesis | — | 15-08 | | | | |
| ‡15-110 | Graduate Thesis | — | 15-09 | | | | |
| | **Psychology** | | | | | | |
| 25-01 | Introductory Psychology | — | — | 4 | 0 | 8 | 4 |
| 25-02 | General Psychology | — | 25-01 | 4 | 0 | 8 | 4 |
| 25-03 | Fundamentals of Psychology | — | — | 3 | 0 | 6 | 3 |
| 25-04 | Social Psychology | — | 25-03 | 3 | 0 | 6 | 3 |
| 25-05 | Applied Psychology | — | 25-03 | 3 | 0 | 6 | 3 |
| 25-11 | Individual Differences | — | 25-02 | 4 | 0 | 8 | 4 |
| 25-12 | Experimental Psychology I | — | 25-02 | 3 | 3 | 6 | 4 |
| 25-13 | Experimental Psychology II | — | 25-02 | 3 | 3 | 6 | 4 |
| 25-14 | Experimental Psychology III | — | 25-02 | 3 | 3 | 6 | 4 |
| 25-15 | Educational Psychology I | — | 25-02 | 4 | 0 | 8 | 4 |
| 25-16 | Educational Psychology II | — | 25-15 | 4 | 0 | 8 | 4 |
| 25-17 | Measurements I | — | 25-02 | 4 | 0 | 8 | 4 |
| 25-18 | Measurements II | — | 25-17 | 4 | 0 | 8 | 4 |
| 25-19 | Measurements III | — | 25-18 | 4 | 0 | 8 | 4 |
| 25-29 | Psychology of Personality | — | 25-11 | 4 | 0 | 8 | 4 |
| 25-31 | Abnormal Psychology I | — | 25-29 | 4 | 0 | 8 | 4 |
| 25-32 | Abnormal Psychology II | — | 25-31 | 4 | 0 | 8 | 4 |
| 25-33 | Social Psychology | — | 25-11 | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.
‡Graduate credit only.

| Course No. | Course | Pre-requisite | Prep-aration | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | **Psychology — Continued** | | | | | | |
| 25-34 | Child Psychology | — | 25-02 | 4 | 0 | 8 | 4 |
| 25-35 | Industrial Psychology I | — | 25-11, 25-17 | 4 | 0 | 8 | 4 |
| 25-36 | Industrial Psychology II | — | 25-35 | 4 | 0 | 8 | 4 |
| 25-41 | Advanced Psychology I | — | 25-11, 25-17 | 4 | 0 | 8 | 4 |
| 25-42 | Advanced Psychology II | — | 25-41 | 4 | 0 | 8 | 4 |
| 25-61 | Directed Study | — | — | 4 | 0 | 8 | 4 |
| 25-62 | Directed Study | — | — | 4 | 0 | 8 | 4 |
| 25-71 | Seminar | — | — | 2 | 0 | 1 | 1 |
| 25-72 | Seminar | — | — | 2 | 0 | 1 | 1 |
| 25-73 | Seminar | — | — | 2 | 0 | 1 | 1 |
| 25-74 | Seminar | — | — | 2 | 0 | 1 | 1 |
| | **Sociology** | | | | | | |
| 26-01 | Principles of Sociology | — | — | 4 | 0 | 8 | 4 |
| 26-02 | Principles of Sociology | — | 26-01 | 4 | 0 | 8 | 4 |
| 26-03 | Introduction to Sociology | — | — | 3 | 0 | 6 | 3 |
| 26-04 | Social Ethics | — | — | 3 | 0 | 6 | 3 |
| 26-05 | Social Pathology | — | — | 3 | 0 | 6 | 3 |
| 26-06 | The Family | — | — | 3 | 0 | 6 | 3 |
| 26-11 | Social Problems | — | 26-02 | 4 | 0 | 8 | 4 |
| 26-12 | Social Problems | — | 26-11 | 4 | 0 | 8 | 4 |
| 26-13 | Social Ethics | — | 26-02 | 4 | 0 | 8 | 4 |
| 26-14 | Social Ethics | — | 26-13 | 4 | 0 | 8 | 4 |
| 26-15 | The Family | — | 26-02 | 4 | 0 | 8 | 4 |
| 26-16 | Criminology | — | 26-02 | 4 | 0 | 8 | 4 |
| 26-17 | Urban Sociology | — | 26-02 | 4 | 0 | 8 | 4 |
| 26-18 | Social Progress | — | 26-12 | 4 | 0 | 8 | 4 |
| 26-19 | Sociological Theory | — | 26-12 | 4 | 0 | 8 | 4 |
| 26-20 | American Social Thought | — | 26-12 | 4 | 0 | 8 | 4 |
| 26-21 | Sociology of Religion | — | 26-12 | 4 | 0 | 8 | 4 |
| 26-22 | Principles of Social Work | — | 26-12 | 4 | 0 | 8 | 4 |
| 26-61 | Seminar | — | — | — | — | — | 4 |
| 26-62 | Seminar | — | 26-61 | — | — | — | 4 |
| | **Spanish** | | | | | | |
| 33-01 | Elementary Spanish | — | — | 3 | 0 | 6 | 3 |
| 33-02 | Elementary Spanish | — | 33-01 | 3 | 0 | 6 | 3 |
| 33-01A | Elementary Spanish | — | — | 5 | 0 | 8 | 4 |
| 33-02A | Elementary Spanish | — | — | 5 | 0 | 8 | 4 |
| 33-03 | Elementary Spanish | — | 33-02 | 3 | 0 | 6 | 3 |
| *33-04 | Elementary Spanish | — | 33-03 | 3 | 0 | 6 | 1½ |
| 33-05 | Introduction to Spanish | — | — | 3 | 0 | 6 | 3 |
| 33-06 | Introduction to Spanish | — | — | 3 | 0 | 6 | 3 |
| 33-07 | Introduction to Spanish | — | — | 3 | 0 | 6 | 3 |
| 33-08 | Introduction to Spanish | — | — | 3 | 0 | 6 | 3 |
| 33-11 | Introduction to Spanish Lit. | — | 33-04 or 2 yrs. of High Schl | 3 | 0 | 6 | 3 |
| 33-12 | Introduction to Spanish Lit. | — | 33-11 | 3 | 0 | 6 | 3 |
| 33-13 | Introduction to Spanish Lit. | — | 33-12 | 3 | 0 | 6 | 3 |
| *33-14 | Introduction to Spanish Lit. | — | 33-13 | 3 | 0 | 6 | 1½ |
| 33-15 | Intermediate Spanish | — | 33-04 | 4 | 0 | 8 | 4 |
| 33-16 | Intermediate Spanish | — | 33-15 | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

| Course No. | Course | Prerequisite | Preparation | Class | Lab. | Prep. | Credit |
|---|---|---|---|---|---|---|---|
| | *Spanish — Continued* | | | | | | |
| 33-21 | Spanish Lit. of the Golden Age | — | 33-14 or 33-16 | 4 | 0 | 8 | 4 |
| 33-22 | Spanish Lit. of the Golden Age | — | 33-21 | 4 | 0 | 8 | 4 |
| 33-23 | Modern Spanish Literature | — | 33-14 or 33-16 | 4 | 0 | 8 | 4 |
| 33-24 | Modern Spanish Literature | — | 33-23 | 4 | 0 | 8 | 4 |
| 33-25 | Modern Spanish American Lit. | — | 33-14 or 33-16 | 4 | 0 | 8 | 4 |
| 33-26 | Modern Spanish American Lit. | — | 33-25 | 4 | 0 | 8 | 4 |
| 33-31 | Adv. Comp. & Conversation | — | 33-22 or 33-24 or 33-26 | 4 | 0 | 8 | 4 |
| 33-32 | Adv. Comp. & Conversation | — | 33-31 | 4 | 0 | 8 | 4 |

*Summer term — 5 weeks.

# General Index

OFFICE HOURS
DEPARTMENT OF ADMISSIONS
9 A.M. to 4 P.M.
daily
Saturday 12.00
Noon
Wednesday Evenings by Appointment

*Northeastern University*
360 HUNTINGTON AVENUE
BOSTON 15, MASS.

*Paste a Small Photo or Snapshot in This Space*

# APPLICATION FOR ADMISSION

(A nonreturnable fee of five dollars must accompany this application. Make checks, money orders, or drafts payable to Northeastern University)

*To Director of Admissions:*

*I* Mr. / Miss ..... *Print First Middle Last Name*

*hereby respectfully apply for admission to the College of*.....

.....*for the school year beginning*.....

*I expect to major in*.....*Veteran:*..... *Yes or No*

**NOTE: The applicant should fill out the following form (both sides) with care.**

*Address*.....

.....*Tel.*.....

*Date of Birth*.....*Age*.....

*Place of Birth*.....

*Race*.....*Religion*.....*Nationality*.....

*Graduate of*.....*High School, Year*.....

*Location of High School*.....

*Name of Principal*.....

*Name and address of other high schools you have attended*.....

.....

*Names of Principals*.....

.....

*If not a graduate, state the years of attendance and why you left*.....

.....

*Father's, mother's, or guardian's name*.....

.....

*Father's birthplace*.....

*Mother's birthplace*.....

*Father's work, business or profession*.....

*Names and addresses of two persons to whom we may direct inquiries concerning you.*

.....

.....

(OVER)

*Weight*.....*Height*.....

*Have you any physical infirmities? Explain, if any*.....

.....

.....

*Defects of speech*.....

*Defects of hearing*.....

*Defects of sight*.....

*Bodily infirmities*.....

*Is your general health good, fair, or poor?*.....

*Have you done collegiate work elsewhere?*.....

*If so, name and address of college or university*.....

.....

*Name of person who will furnish transcript of your college record*.....

.....

*Do you expect advanced credit for past collegiate work?*.....

.....

*List all athletics and other extracurricular high school activities you have engaged in*.....

.....

.....

*Names and addresses of all past employers with brief description of each job, length of employment, and wages received:*.....

.....

.....

.....

.....

.....

.....

.....

**Declaration of Parent or Guardian**

*This application has been read by me and has my approval.*

.....

*Signature of Parent or Guardian*

*Date*.....

*Milton J. Schlagenhauf, Director of Admissions*
*Northeastern University*
*360 Huntington Avenue*
*Boston 15, Massachusetts*

*Dear Sir:*

*Please send me additional information on the following points:*

.....

.....

.....

.....

.....

.....

.....

.....

*Name*.....

*Street and Number*.....

*Town or City*.....

*State*.....

# NORTHEASTERN UNIVERSITY

## *(COEDUCATIONAL)*

---

### *COLLEGE OF LIBERAL ARTS

Offers a broad program of subjects serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for vocational specialization. Degree: Bachelor of Science or Bachelor of Arts.

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Offers curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Classroom study is supplemented by experiment and research in well-equipped laboratories. Degree: Bachelor of Science in the professional field of specialization.

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### SCHOOL OF LAW

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Offers curricula through evening classes in Accounting, Management, Distribution, Law and Business and Engineering and Management; prepares for certified public accountant examinations; arranges intensive programs to meet special needs. Conducts a Labor Relations Institute. Degree: Bachelor of Business Administration with appropriate specifications.

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*For further information regarding any of the above schools, address*

## NORTHEASTERN UNIVERSITY

BOSTON 15, MASSACHUSETTS

*School of Law*
47 Mt. Vernon Street

*Telephone:* KENmore 5800

*Other Schools*
360 Huntington Avenue


NORTHEASTERN UNIVERSITY
LVX
VERITAS
VIRTVS
FOUNDED A.D. 1898
BOSTON, MASSACHUSETTS